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SPRUE.

FAIRLEY (N. Hamilton) & MACKIE (F. P.), assisted by CHITRE (G. D.); GOKHALE (S. K.); GORE (S. N.); MALANDKAR (M. A.); & SACASA (F. J.). **A Progress Report on Researches in Sprue (1924-1925). (From the Bombay Bacteriological Laboratory).**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 105–123. [19 refs.]

The authors investigated, over a period of 18 months, 150 strains of yeasts obtained from sprue cases and others. The results on various media were compared with those given by strains of *Monilia* obtained from the Lister Institute. They consider the classification of yeasts to be in a chaotic state and that considerable variation in their reactions occur according to age and the length of time since isolation.

The results obtained with 137 strains of yeasts from 111 cases of sprue and other diseases, when classified, show that yeasts of the typical *Monilia ashfordi* type are found in about half the cases of sprue, but are present in non-sprue cases and in healthy persons to a similar extent. The toxicity tests revealed no differences in this respect. Repeated intraperitoneal injections in guineapigs give rise to plastic peritonitis and death, while single massive doses by intravenous route are not usually followed by fatal results and virulence is not exalted by passage. These results were obtained with strains of yeasts supplied by ASHFORD himself.

A series of experiments to produce sprue in monkeys by feeding was frustrated by the discovery of a yeast of the *ashfordi* type in their faeces.

Serological investigations revealed common group reactions in the complement fixation tests for *M. ashfordi* and *M. albicans*, so that they proved unsatisfactory.

Evidence that any yeast plays a specific rôle in the etiology of sprue is definitely lacking.

Investigations on the aërobic intestinal bacilli in sprue, compared with the results obtained from controls (normal, enteric, and dysenteric cases), showed that the aërobic bacillary flora of sprue stools resembled most closely that of dysentery; i.e. one half belong to the Colon-aërogenes group, and one-fourth each to the Salmonella and Typhoid-dysentery groups.

As a result of combined clinical and pathological observations the authors regard sprue as due to some infective agency, involving the mucosa of the alimentary tract and leading to the generation of substances which deleteriously affect the blood elements.

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The inflammatory lesions observed in the intestine at autopsy are almost as variable as those in the buccal and lingual mucous membrane. In four autopsies they have observed gross intestinal ulceration once, and enteritis of the terminal portion of the ileum on another occasion. Attenuation of the walls of the small intestine was observed in three cases, but they were never able to prove that this represented atrophy in excess of the general wasting of other viscera.

Special attention has been paid to the intestinal lymphatic system; but without evidence of lymphatic obstruction. The bone marrow in an advanced case of sprue showed the typical picture of pernicious anaemia. Complete aplasia was present with gelatinous greenish-yellow marrow throughout the femur.

As regards the clinical aspects the authors are convinced that sprue is a distinct clinical entity and that it is much more widespread in its atypical forms than is generally recognized. Diagnosis, at least in Bombay, should not be postponed until the classical white, gaseous stools develop, for this represents but one stage. At certain periods the stools may be greenish or brown in colour. Hospital records go to show that patients are frequently admitted with diagnoses of debility and enteritis before some classical feature of sprue develops.

In one group of cases the anaemia dominates the clinical picture; difficulty may even be experienced in differentiating this condition from pernicious anaemia, but emaciation is always present, and the central nervous system is never involved.

Instances of multiple infection in the same family have been noted in certain bungalows and localities. The vast majority of cases were in Europeans or Anglo-Indians, but cases are met with in the Indian community. Long residence and preceding malaria or dysentery are predisposing causes; sprue rarely develops in a healthy person.

The majority of cases showed lowering of the ionic blood calcium, but a figure of less than 7·4 mgm. per 100 cc. of serum was not recorded. They do not regard endocrine deficiency as playing a primary rôle in the aetiology of sprue.

The fractional test meal in 26 cases of sprue showed hyperchlorhydria in 4, 7 were normal, 8 had hypochlorhydria, and in 7 hydrochloric acid was absent.

In pernicious anaemia, true achylia exists and is due to a secretory defect, while the achlorhydria of sprue is due to neutralization by alkaline secretion from the duodenum.

In the great majority of cases anaemia develops; if the disease is advanced, poikilocytosis and anisocytosis are frequent, but nucleated red cells, especially megaloblasts, are rare. High Van den Bergh readings are the rule in pernicious anaemia, exceptional in sprue.

As regards the fat analysis of the faeces, in early cases the findings suggest a failure of pancreatic functions, since fat splitting is inadequate and saponification minimal, but it is much more probable that the motor activities of the entero-colon are entirely responsible. In the well established disease an average of 47·1 per cent. of total fat with a proportion of neutral fat to free fatty acid of 1 : 2·5 was obtained.

The blood contained 259·8 mgm. of fatty acid and 163 mgm. of cholesterol per 100 cc. with a total fat of 412·8 mgm. per cent., an average below the normal—480–670 mgm. per cent. The question naturally arises whether the increased fat content of sprue stools may not be partially dependent on excessive excretion of fat through the intestinal mucosa.

The blood sugar content of the blood was within normal limits. Estimation of the non-proteid nitrogen and chloride contents of the blood did not indicate renal inadequacy. The authors record their opinion that a reading of under 9·4 mgm. of ionic calcium per 100 cc. of serum is diagnostic of sprue, but consider that a course of parathyroid and calcium lactate, as advocated by SCOTT, fails to give results superior to those of adequate dietetic treatment.

P. H. Manson-Bahr.

NEWHAM (H. B.) & MORRIS (R. M.). With Conclusions by MANSON-BAHR (P. H.). **A Study of Sprue and Addisonian Anaemia.**—*Lancet.* 1926. Aug. 7. pp. 269–274. With 3 text figs. [32 refs.]

The aim of this paper is to emphasize the differentiation of sprue from Addisonian anaemia. Three groups of sprue cases may be distinguished: (*a*) With marked gastro-intestinal and mouth symptoms but without noteworthy anaemia; (*b*) with gastro-intestinal and mouth symptoms accompanied by definite anaemia; (*c*) with recurrent attacks of mild gastro-intestinal or mouth symptoms and severe anaemia.

The sex incidence in Addisonian anaemia is given as 2 males: 1 female; in sprue, out of a series of 90, 59 were males and 31 females. This ratio is not absolutely trustworthy as accommodation for female patients is somewhat limited.

Age incidence. Average at onset of sprue for males 42; for females 40 years, extremes 20 and 68. These figures conform closely with those accepted in Addisonian anaemia.

Geographical distribution of sprue. India provided 46, South China 15, Malay and Ceylon 7 each, Burma and the Philippines 2 each, Brazil, Nicaragua, Palestine and West Indies, 1 each. The remainder were 7 seamen who had spent much time in the Far East. The length of residence varied from 19 months to 48 years. In 10 instances the disease did not develop until the return of the patient to England.

In 19 cases the onset was sudden; in 7 it occurred during the course of some other affection.

Of the outstanding symptoms of sprue, diarrhoea was present in all 45 cases showing anaemia; the number of daily stools varied from 1–12. Sore mouth and tongue were present in 38 cases. The glossitis of Addisonian anaemia is only specific when accompanied by a definite clinical picture of the disease. In sprue, the aphthae characteristically occur in crops; in one case 41 vesicles were present at the same time; in other cases with sore mouths, no definite vesicles were ever seen. The relation of the sore tongue to the diarrhoea is not easily made out; in some cases the two symptoms alternated, in others they coincided.

Abdominal Flatulency (40 in 45) and *oesophageal* pain (16 cases) are present in sprue and absent in Addisonian anaemia. Alteration of temperament, common in sprue, was present in no less than 12 cases in this series. Tetany (unknown in Addisonian anaemia) occurred in 3 cases. Loss of weight, 2–4 stone in one year, was commonly recorded; marked loss was noted in 43 out of 45. The skin is dry, discoloured and wrinkled, seldom showing tendency to lemon tinting; pyrexia occurs in sprue as in other severe anaemias. The abdomen is prominent with a tympanitic note extending into the flanks, peristalsis may be visible. In 40 cases the liver dulness was definitely diminished.

Fractional test meals in five cases, yielded achlorhydria in two, hypochlorhydria in two and hyperchlorhydria in one.

Remissions were noted in 22 out of 45, the length varying from three months to ten years. As regards prognosis, seven cases died; the rest left hospital with regained weights, in one case 42 lbs. in 12 weeks' treatment.

The degree of anaemia may vary very considerably. The colour index in all cases, with the exception of two, gave a figure above 1; the highest being 1·44. Leucopenia is a common feature of sprue anaemia. The course of the anaemia is dependent on the response to treatment of the sprue. The improvement is as marked as it is rapid. In one case, on admission, the red blood count was 1,620,000, and haemoglobin 40·7 per cent. Six weeks later, after dietetic treatment alone, it was 4,000,000 red cells and 80 per cent.

The Price-Jones' graphic method of measuring the red blood corpuscles was applied to the blood of ten cases; in only three of these, severe cases, was a curve approximating those seen in Addisonian anaemia obtained. The degree of variation in size of the red cells in the former disease is not spread over so wide a range.

Cholesterol content of the blood. In seven healthy men, the cholesterol content of the blood varied between 0·29 and 0·14 per cent., giving an average of 0·192 per cent.

In eleven cases of sprue there was a definite hypocholesteraemia, and it appears that, on this feature alone, no distinction can be made between it and Addisonian anaemia. As regards blood grouping, the majority of sprue cases were of Group IV.

It is concluded that sprue and Addisonian anaemia, though having several features in common, are distinct clinical entities.

Sprue is definitely a disease of the tropics, in some way connected with the exposure of susceptible individuals to conditions inseparable from life in a tropical climate, Central Africa excepted.

The typical anaemia which accompanies the two diseases is almost identical, but this alone does not indicate a similar aetiology. Addisonian anaemia is generally a fatal disease: sprue by no means so. The toxin of Addisonian anaemia has a most definite selective action upon the peripheral nerves, an effect which is not found in sprue.

P. H. M-B.

Reed (Alfred C.) & Wyckoff (Harry A.). **The Common Picture of Sprue, Pernicious Anemia and Combined Degeneration.**—*Amer. Jl. Trop. Med.* 1926. May. Vol. 6. No. 3. pp. 221–237. [1 ref.]

The purpose of this paper is to show that a common clinical entity is embraced by the diseases commonly diagnosed as tropical sprue, pernicious anaemia and combined degeneration of the spinal cord. A study of published cases leads the authors to think that the three may be due to different manifestations of a common toxin and that this toxin attacks the three systems—the blood, the gastro-intestinal tract and the cord—in varying degrees. For example, typical sprue may show evidence of cord changes and pernicious features in the blood, while typical Addisonian anaemia shows evidence of sprue-like gastro-intestinal changes and of cord degeneration; and subacute combined degeneration of the cord is always associated with a progressive anaemia

which tends to become pernicious in character, frequently with achylia and other gastro-intestinal lesions. It is suggested that the toxin is most likely a group or type toxin and that it originates from the intestinal canal. The evidence they cite in developing this thesis may best be set forth in the subjoined table :—

	Sprue.	Pernicious anaemia.	Combined degeneration.
Insidious onset	+++	+++	+++
Periodicity	+++	++	+ Improves as anaemia improves.
Stomatitis	+++	++	+
Achylia	++	+++	+
Gastro-intestinal atrophy	+++	++	+
Diarrhoea, nausea, vomiting	+++	++	++
Anaemia :			
Secondary type ...	+++	+	+
Later pernicious ...	++	+++	+++
Fever	O	+	+
Fatal when well-established	++	+++	+++
Cord symptoms	+	++	+++
Complexion	Muddy or dark.	Lemon	Biscuit colour

Illustrative cases are cited.

P. H. M-B.

LAMBRIGHT (George L.). **Sprue in the Temperate Zone. With Report of Case.**—*Amer. Jl. Med. Sci.* 1926. Apr. Vol. 171. No. 4. (No. 649). pp. 515–517. [6 refs.]

Sprue is recognized occasionally in Ohio in persons who have resided in tropical regions. The cases so far reported have led to the general belief that it is never acquired in the temperate zone. The case recorded was that of a lady of 30 years in whom illness began insidiously at 16 years of age. On account of the appearance of pernicious anaemia, splenectomy was resorted to without permanent improvement. The differentiation from Addisonian anaemia was effected solely by the isolation of *Monilia psilosis* from the stools. Evidence of blood destruction was found in the presence of urobilin and bile in the urine.

[The evidence of indigenous sprue in Ohio on this one case seems questionable. There appears to be no reason for regarding it as other than an aberrant case of pernicious anaemia ; there were no mouth or tongue symptoms and no mention is made of the size or bulk of the faeces. The leucocyte count is high, whilst in sprue a moderate leucopenia usually accompanies the anaemia.]

P. H. M-B.

LEWIS (W. H.). **Observations in Regard to Sprue in a Section of the South.**—*Southern Med. Jl.* 1925. Nov. Vol. 18. No. 11. pp. 794–795. [7 refs.]

From the author's observation—based upon 18 cases—sprue occurs quite commonly in the southern United States and it is doubtless not

restricted by any degree of latitude. It is probably quite often confused with pellagra, with which it has several features in common. The digestive disturbances peculiar to sprue can be greatly improved by the administration of bile salts.

P. H. M-B.

MIKÉLADZÉ (Ch.). La sprue en Géorgie. [**Sprue in Georgia.**]—*Bull. Soc. Path. Exot.* 1926. Mar. 10. Vol. 19. No. 3. pp. 201–206. [7 refs.] also summarized in *Arch. f. Schiffs- u. Trop. Hyg.* 1926. Feb. 1. Vol. 30. No. 2. p. 94.

Until recently sprue had not been known to occur in Georgia and Transcaucasia, but from September, 1923 to June, 1924, the author was able to report 5 typical cases. He based his diagnosis on the tongue symptoms, the acidity of the saliva, the comparative achylia, the anaemia, leucopenia, etc. It is probable that sprue is a comparatively common disease in Georgia, but most practitioners are unfamiliar with its symptoms and hence do not readily recognize it.

P. H. M-B.

VAN DOOREN (Th. P. C.). Nabetrachting omtrent "Beschouwingen over Indische Spruw". [**Further Reflections in Connexion with "Ideas on Tropical Sprue".**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1925. Vol. 65. No. 6. pp. 751–755.

In continuation of his previous article (see this *Bulletin*, Vol. 21, p. 706), the author records further observations he himself made on his own illness. He developed a distinct aversion, with actual intolerance to certain kinds of food (fish, meat, sugar, etc.). Fruit cures, at first strawberries, later replaced by cherries, prunes, pears, bananas, etc., brought only temporary relief. As a regular diet in sprue, van Dooren recommends raw milk, fruit and vegetables, with restriction of carbohydrates and meat.

He maintains [without producing sufficient argument] that tropical sprue is caused by (1) a congenital disposition ; (2) tropical life with the high demands it puts on metabolism ; (3) monotony of the diet by frequent use of preserved foods and lack of raw and fresh fruit, vegetables, etc.

W. J. Bais.

BAUMGARTNER (E. A.) & THOMAS (W. S.). **A Case of Tropical Sprue with Autopsy.**—*Clifton Med. Bull.* 1925. Oct. Vol. 11. No. 3. pp. 90–93. [8 refs.]

The patient, a lady of 51 years, contracted sprue in the Philippine Islands which, after a course of exceptional severity lasting over three years, proved fatal. A severe degree of anaemia was present. Cultures of the stools on Sabouraud's medium yielded a growth of *Monilia psilosis* which gave the typical reactions. At autopsy, marked emaciation of the body was noted. The stomach contents contained no free hydrochloric acid. The small intestines were dilated and filled with gas and the walls were slightly thinned, the lymph glands of the mesentery enlarged and congested. The blood calcium post-mortem was 5·2 mgm. per 100 cc. of blood. On dissection of the thyroid region only one parathyroid was discovered ; the bone

marrow was of the aplastic type. These writers consider there is not sufficient evidence for regarding the attenuation of the bowel and the shrinkage of the liver as pathognomonic of sprue ; it is not greater, they think, than should be expected in severely emaciated cases. The swollen mesenteric lymph glands they attribute to the presence of Monilia. They agree with FALCONER and ROWE (see this *Bulletin*, Vol. 8, p. 148) that there is no characteristic pathological lesion to account for the severe symptoms found in tropical sprue.

P. H. M–B.

NEWHAM (H. B.). **Notes on the Analysis of Sprue Stools.**—*Jl. Trop. Med. & Hyg.* 1926. June 15. Vol. 29. No. 12. pp. 169–170. [3 refs.]

The results recorded were derived from a study of 11 cases of sprue. With a view to ascertain whether analyses conducted at definite intervals on typical cases of sprue would afford any evidence as to the general condition of the patient, weekly analyses were conducted on a series of 6 cases over a period of 5 weeks. In all cases Cammidge's method of analysis was followed. With progressive improvement in the patient's condition the only figures which reflect this improvement, as judged by the fat analysis of the faeces, are those of the total fat, which fell in this one case from 56 to 44 per cent. There appears to be a slow and very gradual improvement in the fat content, but by no means to the extent of the almost dramatic improvement in the patient's condition. In one instance in which an analysis was made eight months after all symptoms had disappeared and while the patient was subsisting on a mixed diet, the figures for total fat were still above the normal. The proportions of soaps, neutral fat and fatty acids vary very largely from week to week, even on a constant dietary ; the figures for neutral fat in such an instance may range from 7·82 to 1·78 per cent. The biliary functions of the liver are deranged in sprue, and some light was thrown on this subject by an investigation upon the cholesterol output in the faeces. The cholesterol introduced into the bowel with the bile is excreted in the faeces as stercorin, but in no cases of sprue did the output of the substance approach the normal. The output of stercorin varied from 0·147 to 0·328 gm. in the twenty-four hours.

P. H. M–B.

ASHFORD (Bailey K.) & HERNÁNDEZ (Luis G.). **Blood-Serum Calcium in Sprue and other Pathologic States in the Tropics.**—*Amer. Jl. Med. Sci.* 1926. Apr. Vol. 171. No. 4. (No. 649). pp. 575–591. [29 refs.]

The calcium content in the blood serum of normal persons in Porto Rico was determined from blood samples of 96 healthy soldiers. Taking 9–12 mgm. per 100 cc. as the normal limits of total serum calcium and from 4·5–6 mgm. for diffusible calcium, then 17·7 per cent. of these healthy soldiers fell below the normal and, as regards diffusible serum calcium, 38·52 per cent. It therefore seems justifiable to consider that the serum calcium in healthy persons in Porto Rico is somewhat low. In a study of the serum calcium of 101 persons suffering from " the syndrome of nutritional unbalance for the island," which is described, 45·64 per cent. fell below the minimum for the

total and 66·33 per cent. for the diffusible serum calcium; in sprue, on the other hand, 47·25 per cent. are below the minimum for the total and 72·71 per cent. for the diffusible calcium, respectively. In 47 cases of sundry diseases without any clinical evidence of sprue these percentages are respectively 44·66 and 62·74. On the whole the sprue cases show the lowest serum calcium values, although there is not sufficient difference between the three pathological classes to warrant the statement that sprue can be distinguished from the others by such insignificant calcium deficiency. Over one-half of the severe and cachectic cases, in which the disease was so apparent as to exclude any other diagnosis, gave normal total calcium values, while one-fourth gave a normal diffusible calcium. All doubt on the unreliability of total or diffusible calcium values is removed by the study of a table based upon calcium estimations of 456 inmates of the insane asylum, 55·48 per cent. of whom were below normal in total and 79·36 in diffusible calcium.

In order to clear up this point and the question of the efficacy of parathyroid gland extract in the treatment of sprue, two batches of injectable parathyroid were procured. To one set of 24 cases one lot and to the other 26 the other lot was administered. From tables constructed from the results there appears to be a real rise in serum calcium after intramuscular injection, but it appears to be temporary only. On the other hand long-standing cases of sprue have attained a normal calcium serum content with diet alone, or monilia vaccine, but always in conjunction with improved nutrition, improved digestion and the restoration of glandular efficiency. Possibly then the persistent use of parathyroid is one of the many means of improving the condition of the patient, but it is by no means to be compared with the efficacy of diet. Muscular cramps in sprue are, in fact, tetany, and these symptoms disappear after injection of parathyroid extract. Calcium lactate administered by the mouth cannot be depended upon to raise the calcium content of the serum, but its use is sanctioned by the favourable clinical results obtained; the improvement may be gradual and only result from long and regular administration. No further advantage was obtained by giving parathyroid gland *per os*. A comparison in table form of a series of cases which received no parathyroid or calcium compared with a similar series on this form of medication failed to demonstrate any appreciable difference in the calcium serum content. The method of estimating calcium in blood serum was by Tisdall's modification of Kramer and Tisdall's method.

P. H. M–B.

SHELTON (C. F.). **Treatment of Sprue with Calcium Lactate and Parathyroid Extract.** [Memoranda.]—*Brit. Med. Jl.* 1925. Nov. 7. p. 844.

The patient, who apparently had contracted the infection in India, developed symptoms of sprue in East Africa. The usual diarrhoea and emaciation were present, the loss of body weight being 16 lbs. Within six weeks he was discharged from hospital, having been carefully dieted and dosed with calcium lactate and parathyroid, with the result that rapid amelioration took place. Within four months he was able to return to work at Mombasa.

P. H. M–B.

VAN STEENIS (P. B.). Onderzoekingen met de duodenaalsonde bij lijders aan tropische Spruw. [**The Duodenal Tube in Tropical Sprue.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 1. pp. 117–138.

The clinical history of three patients is quoted in every detail. Special attention was paid to the secretions of liver and pancreas, samples of the contents of the duodenum being taken by means of the duodenal tube. The constituents of the bile in all cases were found to be below the normal; the decrease of bile acid salts was most marked. In accordance herewith the excretion of urobilin in faeces and urine was very low in two cases; in the third case (studied during recovery) the urobilin excretion was normal, though low. The secretion of the pancreas (lipase, amylase, trypsin) appeared to be normal. In two cases the colon bacillus was found in the duodenum, in the third a streptococcus.

The lowered secretion of bile in tropical sprue may be the cause of the prevalence of anaerobic bacilli in the intestine and subsequently of the intestinal fermentation, meteorism, etc.

The fat of the faeces consisted for a great part of fatty acids; thus the fat appeared to be sufficiently predigested (pancreatic ferments) but the absorption was hindered by the absence of bile.

W. J. Bais.

SCHROLL (G.). "**Pseudo-Sprue.**"—*Ugeskrift f. Laeger.* 1926. Mar. 18. Vol. 88. No. 11. pp. 276–277.

This article was prompted by a report of four cases of a sprue-like disease occurring in Denmark published in the same journal last year by Hess THAYSEN (*ante*, p. 46). This author inclined to the view that "sprue" was only a symptom-complex which may be found in different diseases. "Sprue" is characterized by the chronic intermittent afebrile fatty diarrhoea, the typical stomatitis and the blood picture which not uncommonly—some say "as a rule"—resembles that of pernicious anaemia. The description of the tongue in sprue tallies with that given by various authors in pernicious anaemia. It is well recognized that chronic intermittent diarrhoea often occurs in pernicious anaemia. If, now, fatty diarrhoea supervenes in the last-named disease, perhaps arising from the consumption of so much fat (cream, yolk of egg) that the intestine and pancreas, weakened by the grave anaemia, are unable to digest and absorb it, we shall have a clinical picture exhibiting all the characteristics of sprue. That something like this actually occurs is shown by two cases that are fully recorded.

E. E. Atkin.

RODRIGUEZ ARJONA (Vicente). El Sprúo o Diarrea crónica de Cochinchina en la Península de Yucatán. [**Sprue or "Chronic Diarrhoea of Cochinchina" in the Yucatan Peninsula.**]—*Rev. Yucateca de Dermat. y Parasit.* 1926. Feb. 15. Vol. 1. No. 4. pp. 118–126. With 1 text fig.

This is a general and superficial account of sprue, ignoring all recent work on the subject. No new points are adduced and old mistakes are perpetuated. For example: (1) That the condition nearly always follows disease of the alimentary tract, such as dysentery or intestinal parasitic infection; (2) that *Monilia albicans* in tropical countries acquires virulence and produces sprue; (3) that if a case remains undiagnosed for 6–10 months no treatment is of any avail.

H. Harold Scott.

MALARIA.

i. JAMES (S. P.). **Epidemiological Results of a Laboratory Study of Malaria in England.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Vol. 20. No. 3. pp. 143–157. [3 refs.]

ii. LEAGUE OF NATIONS. Health Organisation. **Malaria Commission. Report on the First Results of Laboratory Work on Malaria in England.** [JAMES (S. P.) assisted by SHUTE (P. G.)]—30 pp. C.H. Malaria 57 (1). 1926. Geneva.

iii. LE PRINCE (J. A.). **Destroying Engorged Anopheles as a Malaria Control Measure.**—*Public Health Rep.* 1926. June 18. Vol. 41. No. 25. pp. 1220–1226. [7 refs.]

i. & ii. These papers are likely to be of such importance and are so full of valuable observations that no excuse is offered for this long abstract.

An exhibited stereophotomicrograph of the spirochaetes of syphilis in the aorta of a patient suffering from general paralysis showed how indefensible might be the injection of such blood into other patients. Accordingly in England the official arrangement is that malarial infection, used in the treatment of this disease, shall be carried through mosquitoes. The infective agent was *Anopheles maculipennis*, the malaria parasite *Plasmodium vivax* of two strains, one from India, one from Madagascar. About 3,200 female *A. maculipennis* were collected in the adult stage from a country district where there was no malaria and used in 22 batches. Having been fed on one or more gametocyte carriers they were incubated at 22° to 24° C. in a saturated atmosphere till infective and then kept till required in an ice chest at temperatures of 4° to 6° C.

The following facts have emerged. Under these presumably favourable and sheltered conditions of incubation, the anopheline mortality is about 50 per cent. per week, so that, of 3,200, only 715 survived to infectivity. Only a small proportion of persons suffering from malaria are infective to mosquitoes. Gametocytes have never been found in thin films before the 7th day after the first rise in temperature, and about 3 days more elapse before they will infect mosquitoes. Their number rises rapidly, usually reaching a maximum about the second week of illness. More importance is, however, laid upon their "quality" than their quantity, since there have been many failures when their numbers have been in excess of the often-quoted figure of 12 per cmm. of blood. Their numbers vary extraordinarily, increasing for example in one case from 7 to 700 per 500 leucocytes ; and females have outnumbered males. The infection of *A. maculipennis* after one feed upon an infective case is quite uncertain, and unless the quality of gametocytes is such that their host is an " exceptionally good infector of anopheles " several feeds are necessary to secure a 100 per cent. infection of a batch. This seems to be due in part to the influence of the mosquito's food, certain parts of the blood of certain animals and birds rendering the stomach unsuitable for oocyst formation. Again, oocysts may form and die, the sporozoit stage never being reached, so that the finding of oocysts is no evidence that a mosquito, [and presumably a mosquito species] may become infective. Further, in mosquitoes carrying nearly ripe eggs, the swollen ovaries prevent blood

from entering the midgut and the mosquito from becoming infective, although in this case the oesophageal diverticula may be ballooned and give a false impression of probable infectivity. Similarly, individual greediness is a potent factor in determining the quantity of blood imbibed, though when gluttony pushes this to the extent of immediate evacuation it will operate against the likehood of infectivity. "The difficulties which have had to be overcome in order to obtain supplies of mosquitoes with 100 per cent. sporozoite infection of the glands have helped us to realize how many special conditions must be fulfilled in nature for the effective transmission of malaria from man to mosquitoes."

Infectivity having been acquired may be very persistent, surviving, for example, during three weeks at temperatures between 4° and 5·5° C. and during six days when it is below 0° C.; mosquitoes have remained infective from 29 to 92 days, so that taken with the findings of SWELLENGREBEL (this *Bulletin*, Vol. 22, p. 397), WENYON (Vol. 19, p. 277) and SELLA (Vol. 17, p. 147) "we do not doubt that *P. vivax* can be carried through even a severe winter in hibernating mosquitoes, and that the carriage may be in either the oocyst stage or the sporozoite stage of the parasite or both."

Experiments showed that persistence of infectivity, when numerous opportunities of feeding were given, depended largely on continued reinfections. In passing on infection to man, 52 of 221 persons failed to develop malaria within the usual incubation period, and 50 of these failures occurred between November and March. Yet during these winter months patients kept in bed in a warm room during the incubation period developed malaria, while others working in the fields did not. These failures to infect could not be explained on technical grounds, and so are referable to biological differences. Three types of susceptibility to infection are illustrated by cases.

A case of normal susceptibility: bitten in July by 35 and by 8 infected mosquitoes, developing quotidian and tertian rigors, treated by 2 gm. (30 gr. of quinine daily for 5 days, reinfected by 120 mosquitoes a month later, developing 10 tertian rigors and, after repetition of the treatment, remaining free from malaria (8 months). A case of supersensibility: bitten in August by 60 infected mosquitoes, showing 12 severe quotidian rigors, treated as above, relapsing six times, each relapse being treated in the same way. A case of refractory type: bitten in December, February and April by 7, 9, 14 and 7 infected insects, showing 5 quotidian rigors, these disappearing without treatment, and the patient remaining well to date (3 months) without any quinine.

Applying this experience to war cases, it is held that of the many thousands of malarial infections a certain number were of the supersensitive type and that these furnished the relapses seen in England. It is considered, then, that in a malarious place a few only of the vast numbers of anopheles become transmitters of malaria, and they do so because they happen to pass their life in an environment and manner very different to the others. After their first feed they become overloaded with blood and will fly but a few feet to some sheltered nook, whence they emerge nightly to feed and in time to infect or reinfect the household. The house, then, is the place where they must be sought and destroyed.

In discussion Colonel Clayton LANE referred to the analogous condition noted by Dr. MANSON-BAHR as being produced in *Stegomyia*

pseudoscutellaris by *F. bancrofti* in Fiji where a heavy infection sickened and killed the mosquito, so that a heavily infected human case was a smaller risk to the community than a light one, and asked whether there was any evidence that malarial infection killed more mosquitoes than died when fed on non-malarial blood. He noted that no Italian "bonification" was held complete without satisfactory housing. Dr. HANSCHELL urged the use of the household mosquito trap which he had found effective for mosquitoes in Barbadoes, where, however, anopheles did not occur, and of the household larval trap which the late Dr. COGHILL instituted and used most effectively in Lagos in 1913. This consists of a tray containing weak copper sulphate solution, in which mosquitoes oviposit but in which larvae die for lack of food. Colonel GILL held that the supersensitive case was the rule in India, and noted his failure to find any method of estimating the dose of sporozoits owing to the varying individual infectivity of any infected batch. In his experience, measured by their longevity, there was no disability to mosquitoes in India with malarial infection, and he questioned whether the house played an important part in infection in the tropics. Dr. STANNUS, without encouraging this means of protection, knew a number of men who drank two bottles of whisky a day and had had no malaria over a period of many years. Sir Almroth WRIGHT detailed the many fallacies which are inherent in such statistics as those dealing with the effect of malaria upon general paralysis and offered help in the physiological problems concerned. Dr. RUDOLF, referring to refractoriness to infection and the finding of Dr. MARSH that blood sugar decreased during malarial fever, suggested that it might be a matter of glucose content of blood. He emphasized that one who contrasted the discharges from Claybury Hospital of paralytics treated by malaria with conditions before this treatment could not question its effect. Dr. BALFOUR pointed out that all these paralytics must have had arsenicals, and that too little attention seemed to have been paid to that point in considering the striking effect of quinine on the malaria of these cases. The pH content of the mosquito's stomach might be a matter of importance. In reply Colonel James stressed the reasons which had led the Malaria Commission of the League of Nations to advise that in the European countries which they visited it would be best to deal with endemic malaria by measures limited to affected individuals and to the interiors of the houses in which they lived.

iii. Le Prince dealing with the house habits of anopheles in the Panama Canal Zone, writes: "After many species of *Anopheles* become engorged they rest . . . . relatively close to where they obtained their blood meal," and "are relatively easy to destroy." If destroyed at a definite hour each morning, malaria transmission will practically be prevented in that house.

"In 1908 a temporary labourers' camp, consisting of tents, was established near the site of the present Miraflores Locks and used for four and a half months during the rainy season, when malaria transmission is most frequent. This camp was completely surrounded by extensive untreated *Anopheles* breeding places. A labourer with a fly swatter and catching tube was employed to destroy all the *Anopheles* he could find in the tents. Each tent was examined soon after the labourers left each morning. The malaria incidence among the labourers in these tents was thus kept down to 4 per cent. per month, or the normal rate at that time for the Canal Zone labourers sleeping in screened buildings at camps where mosquito-control work was being done."

Clayton Lane.

LABERNADIE (V. G. F.). Quelques remarques sur le paludisme en Guyane. [**Remarks on Malaria in French Guiana.** *Bull. Soc. Path. Exot.* 1926. Mar. 10 & Apr. 14. Vol. 19. Nos. 3 & 4. pp. 213–222; 280–287. With 1 folding chart. [11 refs.]

Is it surprising that Labernadie writes with bitterness of permanent "temporary" dwellings where passing miners are herded with their families in filthy rooms; of penitentiary camps and depots, so placed that culicines swarm and neither gauze nor mosquito nets are permitted on the ground that they interfere with the discipline of repression; and where an infection of 30 per cent. of corpuscles seem to give the swarms of culicines an opportunity for mechanical carriage? In the forested hinterland, where malaria was said to be absent, he found children, born and bred there, to have enlarged spleens and some of the adults examined to be infected. In heavily infected and debilitated persons unusual forms of parasite have been found, such as *tenue* shapes and in one case two unequal caryosomes at opposite ends of a horizontal oval with linear projections recalling the astronomical sign for Neptune. Malaria and helminthiasis are held to have no reciprocal action.

P. vivax has been found more resistant to quinine than *P. falciparum*. Sulphate of soda 10 gm. (ʒijss) each morning has been a beneficial adjuvant, as were arsenic (arrhénal) and 0·03 to 0·08 gm. of iodine as "iodo-iodurée." Stovarsol and tréparsol are also advised with quinine, which, in tablets, has given satisfaction and has shown absorption by being detected in the urine. Regarding prophylaxis the writer asks what can be done without men or money.

C. L.

DAVIS (Nelson C.) & BOYD (Mark F.). **The Occurrence of Quartan Malaria in the Low Coastal Regions of the State of Rio de Janeiro, Brazil. An Epidemiological Study.** *Amer. Jl. Trop. Med.* 1926. May. Vol. 6. No. 3. pp. 195–203. With 1 text fig. [4 refs.]

In over 1,700 positive malarial blood examinations recorded in four villages over 6 months, 20 cases of quartan malaria were found. Their distribution was, in certain instances at least, focal, with fresh cases appearing each year. It is believed that this species is probably more common than is supposed, since microscopists, by its rarity, become biased in favour of other species, the rings if few are difficult to determine, and in mixed infections the common *vivax* forms will tend to the overlooking of the others. No obvious reason for the failure of quartan malaria to effect an epidemic increase was discovered.

C. L.

MAZZA (Salvador) & GONZÁLEZ (Conrado). Informe epidemiológico palúdico de la margen izquierda del rio Chico en la ciudad de Jujuy. **Malarial Notes of the City of Jujuy, Argentina.** *Bol. Inst. Clin. Quirúrg.* Buenos Aires. 1926. Apr. No. 11. 7 pp. With 5 figs.

During February 503 thick drop examinations disclosed 37 per cent. of positives. Of the positives, 26 per cent. showed gametocytes or a gametocyte index of nearly 10 per cent. Of plasmodial carriers 73·5 per cent. harboured *P. falciparum*, 18·3 per cent. *P. vivax*, 1·8 per

cent. *P. malariae*, and 6·4 per cent. mixed forms. The sporozoit rate of 28 female anopheles, believed to be *A. pseudopunctipennis*, was 7·14. Children numbered 207 with a spleen rate of 62·8.

C. L.

MACDONALD (G.). **Malaria in the Children of Freetown, Sierra Leone.** -*Ann. Trop. Med. & Parasit.* 1926. Aug. 13. Vol. 20. No. 3. pp. 239-262. With 2 text figs. & 1 map. [9 refs.]

The writer has worked in conjunction with the Lady Medical Officer, Dr. M. G. BLACKLOCK. Splenic enlargement is measured by CHRISTOPHERS' standard abdominal chart (this *Bulletin*, Vol. 21, p. 598) modified in so far as the African child's relative measurements have been found to differ from those of the Indian. For example, with a sitting height of 60 cm. the malarial spleen passes under the costal margin at 13 cm. from the umbilicus in the African as compared with 14 in the Indian. In addition, when not dealing, as CHRISTOPHERS was, with a hyperendemic area, it is suggested that a just palpable spleen should be taken as having its apex 15 cm. from the umbilicus. A table is added by means of which —knowing the sitting height, the internipple line or the nipple-umbilical line—the measurements obtained by Christophers' methods can be reduced without calculation to that of the Standard Child and charted on the Standard Chart. Another table shows that in 445 African children the splenic apex was, on the average, charted within 0·2 cm. of the same spot whichever of the three lines was taken as the basis of measurement, so that that line may be used which is most readily measured under local conditions.

The area dealt with contains an endemic portion (spleen rate 50) and a hyperendemic portion (spleen rate 72). In the endemic area the parasite and spleen rates varied little from 3-12 years of age. In the hyperendemic area the parasite rate fell at 11 years, whereas the spleen rate was least from 7 to 10 years and rose again at 11. The numbers concerned were considerable. The highest parasite rates were in those whose splenic apices lay between 6 and 21 cm. from the umbilicus. The parasite rate was determined by examination of a single thin ear film, Giemsa stained and examined for at least 10 minutes. Of 1,059 examined 51 per cent. showed parasites.

	Endemic area.	Hyperendemic area.
Children examined	722	337
Percentage infected	41	72
Percentage of parasites among the infected :		
Subtertian	83	78
Quartan	14	19
Tertian	2	2
Percentage of pigmented leucocytes only ...	1	1

Of 49 boys examined 7 times, or less if malaria parasites were discovered earlier, 98 per cent. showed definite evidence of illness and 86 per cent. parasites, although 47 per cent. only had shown parasites at the first examination.

In 1,007 of these children the temperature was taken and was constantly raised, but without relationship to parasite or spleen rates. The hyperendemic area was in close proximity to the breeding-places of *A. costalis*.

C. L.

ESSED (W. F. R.). **Preliminary Report of Malaria on the Poelau Toedjoeh.**—*Meded. Dienst. d. Volksgezondheid in Nederl.-Indië.* 1925. Pt. 3. pp. 292–300. With 1 fig.

A survey of these scattered islands lying eastward of Borneo and close to the equator shows that they fall into two malarial groups, those with hills rising from a narrow coastal strip exhibiting WATSON's "malaria of the coastal hills" with *A. maculatus* as the carrier, and those with a wide coastal area, swampy and densely covered with vegetation, with *A. umbrosus* as carrier. The malaria problem is accordingly of special interest rendering further investigations desirable.

C. L.

ESSED (W. F. R.). **Malaria at Tandjong Pinang [Sumatra].** —*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1925. Pt. 3. pp. 301–317. With 11 figs.

A report of a detailed local malarial survey. The splenic index varies in different parts from 5·1 to 73·1 per cent. in over 500 examinations, and the parasite index in 545 films varied in children from 13·4 to 42. The anopheles bred from larvae were *A. maculatus* 453, *A. kochi* 127, *A. sinensis separatus* 77, *A. karwari* 19 and *A. umbrosus* 2. The first were, as usual, found almost exclusively in exposed, clear, running water. There were 3 exceptions: a hole in swampy ground with dirty water (with *sinensis separatus*), a mud puddle with the same and with *kochi*, and in what is called a well, but is probably a spring, with the same two species and with *karwari* also. The anopheles density was low, but it is suggested that there may occur *maculatus* waves as reported by WATSON in Malaya and SCHÜFFNER on the Karo plateau.

A swamp seemingly propitious for *A. umbrosus* contained no larvae, although they were present in a puddle a few metres away, an example of the seeming freakishness of anopheline breeding in our present state of knowledge. It is concluded from the nature of catches in and out of doors that *A. maculatus* feeds exclusively at night and then immediately leaves the house, and that this mosquito is the local host—from analogy with the topography of Malaya—because splenic and parasite indexes are highest near its breeding places, because it is the prevalent mosquito with the most extensive breeding grounds, because it attacks man at night, and because it has been found locally infected. The danger of exposing the water table in any excavations in this *maculatus* country is emphasized.

C. L.

KLIGLER (I. J.). **The Epidemiology of Malaria in Palestine. A Contribution to the Epidemiology of Malaria.** *Amer. Jl. Hyg.* 1926. May. Vol. 6. No. 3. pp. 431–449. With 3 charts in text. [6 refs.]

Regarding conditions favouring anopheline breeding, it is concluded that the mosquito and malaria prevalence for the season can be predicted with considerable accuracy from the character of the winter rains. The position is then parallel to that which, as readers of this *Bulletin* are aware, GILL has for several years maintained to hold for the S.W. monsoon and the Punjab. Arab and Bedouin carriers are difficult problems. A steady influx of susceptibles, a quarter of them

by birth, provides the third essential for epidemic conditions. Seasonal prevalence has three peaks, March–April almost exclusively tertian, June–July predominantly tertian, October–November predominantly subtertian. The chart in the text does not show this, but, being arranged in percentages of primary and secondary malaria, could not. Regarding this last distinction it is held that new infections cannot be the cause of the first peak, because the first spring brood of mosquitoes does not appear till at least the end of March, and could not cause it, so that they must be relapses. [It will be noted that the possibility of winter house infection is not mooted.] Regarding the three anopheles possibly implicated, *A. elutus*, *A. sergenti* and *A. superpictus*, dissection of 1,500 of the first and 400 of the second has shown 12 and 1 infections respectively.

In explanation of the seasonal prevalence of malaria Kligler considers WENYON's hypothesis (Vol. 19, p. 277), that there are more carriers of tertian malaria in the spring and that this preponderance ceases through quinine administration which sterilizes the gametes of tertian but not those of subtertian malaria. He points out that Arab and Bedouin show these features, but their consumption of quinine is negligible. He concludes from the literature that the effect of temperature on the exogenous cycle merits more investigation.

C. L.

MAIRE (G. L. E.) & SABBAGH (A.). Le paludisme dans la région de Damas. **Malaria in the Damascus District.** *Arch. Méd. et Pharm Milit.* 1926. Mar. Vol. 84. No. 3. pp. 253–291. With 3 charts & 3 maps. [17 refs.]

The irrigating rivers give to the Damascus oasis its life and beauty. Irrigation is intermittent, for the demand is such that any portion of land receives water only once or twice a week, and absorbs it with avidity: there were, till recently, pestilent marshes produced by percolation but these have been drained and turned into pleasure grounds. There are still stagnant collections deliberately induced to obtain a head for the production of electric current or for the steeping of hemp, and, by the lake of Ateibé some 30 kilometres distant with its huge adjacent marshes, malaria is rampant. The temperature from May to November is favourable for development in *A. maculipennis*, the only species hitherto found. *P. malariae* was not noted about Damascus, the percentages of *P. falciparum* and *P. vivax* being respectively 6·78 and 93·21. The malarial season is from June to November. Manifestations have the usual characters. Not less than 2 gm. daily of quinine is held necessary, given for *P. vivax* during 4 weeks and for *P. falciparum* during 6 weeks, none being given on one day of each week. Intravenous medication is reserved for pernicious attacks; intramuscular is rarely used; oral administration is the rule, supplemented as desired by injections of cacodylate of soda and colloidal iron. For individual protection a large, as contrasted with a small, mosquito net is advocated, and screening of houses where reasonably possible. Regarding preventive quinine the writer, evidently with deliberation, writes cryptically that its administration is a dogma which at the present time can no longer be discussed, but that even if the dogma be sacrosanct the dose should vary from 0·25 to 0·4 gm. [4 to 6 gr.]. Anti-mosquito measures are sketched on general lines.

C. L.

MALARIACOMMISSIE VOOR NOORDHOLLAND. Jaarverslag der Wetenschappelijke Malaria-Commissie voor Noord-Holland over 1925. [**Report of Malaria Commission for Noord-Holland.**] [ALDERSHOFF (H.), Chairman, KORTEWEG (P. C.), Secretary.]—33 pp. [32 refs.] 1926.

Another of these valuable reports (see this *Bulletin*, Vol. 22, p. 818). Anopheles containing blood were found throughout the year in stables, while in houses December was the only month in which none such were collected. There is then no true hibernation in Holland. In 1925 the first males, indicating the hatching of the new brood, were found on 4th June. From 311 of 2,097 stables examined in Amsterdam, some 4,600,000 anopheles were recovered, and 2,157 from 196 dwellings in which cases of malaria had appeared. The distribution of malaria is considered, and note is made of a pamphlet on The Dutch Quinine Trust *versus* Smalarina, and considerable attention paid to a paper on this subject by DRIESSEN. [If any are disposed to think that Dutch bias exists on this point, perusal of reports by LOW and GREGG, this *Bulletin*, Vol. 22, p. 819, and SULDEY (*infra*) is recommended.] The Commission has undertaken investigations on the value of mercury in malaria and has found it useless. Certain measures for destroying anopheles were investigated. A.B.I.S. consists of petroleum with 6 to 10 per cent. carbon tetrachloride to cover the smell; A.R.D.I. of petroleum with 10 to 15 per cent. of carbon tetrachloride, 1·8 to 2 per cent. of methyl salicylate and some resin. The varying composition, the strong petroleum smell of the first and the stickiness of the second, are drawbacks. Flyosan and R.I.D.S. worked well and appear more acceptable to farmers than lysol. VAN THIEL has examined hundreds of *Anopheles maculipennis* and has found that in wing length and number of maxillary teeth there are local races. The highest chlorine content of water in which anopheles larvae were found was 2 gm. per litre with a specific gravity of 1,004·8. A malaria film is being shown. A list of publications dealing with malaria in Holland during 1925 is added.

C. L.

PUBLIC HEALTH BULLETIN. Washington. No. 156. 1925. Aug. pp. v + 142. With 1 text fig. & 8 figs. on 4 plates. **Transactions of the Fifth Conference of Malaria Field Workers, held at New Orleans, Louisiana, November 25 and 26, 1924.**

The note on which Surgeon General A. M. STIMSON opened this congress of nearly 100 members was the determining rôle which economic conditions play in malaria. BARBER, KOMP and HAYNE instanced plentiful anopheles with little malaria in a sugar plantation county where malaria had decreased as "pioneer conditions of living" have been discontinued. DEEKS styled poverty, ignorance, and poor living conditions as the handmaids of malaria and hookworm disease. KLIGLER, speaking of Palestine, described malaria houses and the preference of anopheles, not for animals but for their houses if of a certain type. WILLIAMS, dealing with America, was not much interested in the gravity of breeding, but deeply so in the "bedroom rate" of *A. quadrimaculatus*. LE PRINCE showed that 100 per cent. of families of coloured farm tenants, when they understood the need and value of screens, could be interested in the screens. SHAW's aphorism was,

"malaria perpetuates ignorance and ignorance perpetuates malaria." MAYNE and DARLING showed that a preponderance of male anopheles indicated proximity to breeding places.

C. L.

MARCHOUX (E.). Unicité ou pluralité des hématozoaires du paludisme. **Malarial Parasites: One or Many.**—*Semana Méd.* 1926. May 20. Vol. 33. No. 20. (1688). pp. 1091–1094.

The case for unicity is put thus: Polymorphic parasites vary with their surroundings, variations succeeding one another in certain countries when there is modification of the body medium. Thus, in Senegal, the natives harbour large forms and Europeans the small pigmented forms, but the European returning to Europe relapses as large forms. Such a substitution of large for small forms, in examinations separated by 1 or 2 days, has been observed. Again, it is held that parasites producing the same type of fever vary definitely with the locality, as, for instance, in the specimens of *P. vivax* coming from the Amazons, Cape Verde Island or Indo-China, while there have also been described such forms as *P. vivax minutum*, *P. tenue*, and *P. caucasicum*, so that the 3 species of the pluralists do not hold. [These appearances were of course seen in dried films.]

The case against unicity is put thus: Most malariologists hold to 3 species, *P. vivax*, *P. malariae* and *P. falciparum*, which differ morphologically not only in the human, but in the mosquito cycle, as, for example, in pigment, refractivity, and in size of sporozoites, and in the period taken for development. The Senegal findings simply imply that the environmental conditions favour the growth of one species rather than the others. The large numbers of injections now made show [in an infection established as microscopically pure] always the same form, and as JAMES maintains the same form may hold in strains with varying characters. The culture of parasites has not been sufficiently successful to test unicity or plurality. The different forms produce different lesions, such as the capillary collections of *P. falciparum*, and the effects on splenomegaly of *P. vivax*. The action of quinine and stovarsol on the several parasites differs. Marchoux ranges himself with the pluralists.

C. L.

MARCHIAFAVA (Ettore). Discorso inaugurale del I. Congresso Internazionale sulla malaria. (Roma 3–6 ottobre 1925). [**Inaugural Discourse at the First International Malaria Congress, Rome.**]—*Riv. di Malariologia.* 1926. Mar.–Apr. Vol. 5. No. 2. pp. 182–190. [English summary p. 252.]

The English abstract describes this as a "historical reconstruction of our knowledge on malaria" and mentions the names of VARRONE, who suspected minute organisms in swamps, LANCISI, who believed mosquitoes to be harmful through their saliva, TORTI, who described malaria in relation to the action of quinine, BASSI, who believed that undiscovered parasites renewed the fever by their reproduction, and BIGNAMI who, by "a work of subtle criticism foresees that the transmission must take place through the body of the mosquito." In the Italian original there are mentioned many other Italians, and three non-Italians, PASTEUR, MANSON and ROSS.

C. L.

DARLING (Samuel T.). **Splenic Enlargement as a Measure of Malaria.**—*Ann. Clin. Med.* 1926. Mar. Vol. 4. No. 9. pp. 695–712. With 7 charts.

This paper, by the late Dr. Samuel T. Darling, completed by the aid of his co-workers, deals, as its title shows, mainly with splenic enlargement, a method of malarial measurement first employed by DEMPSTER in India just on 80 years ago and tested to the full there, and, of course, elsewhere in the world, and latterly used in the United States with benefit. Many autopsies convinced Darling of the general truth insisted on by MANSON, that it is in the finest capillaries, those of the grey matter of the brain, and in the reticulated sinuses of spleen and bone marrow [and placenta] that segmenting and sexual parasites chiefly congregate. He explains this by suggesting a stickiness in these parasites. The enlargement of the spleen produced by the effects of this accumulation he measured, as of old, by finger breadths of projection, by palpability in ordinary conditions and on deep inspiration with the child reclining; and converts those to weight measurements [on the principle of CHRISTOPHERS' "spleens].

More exact measurements, such as those relating to sitting height, have been dismissed as requiring too much exposure in the climate with which he dealt. In Lee County spleen rates chills and fever and *A. pseudomaculatus* run parallel.

C. L.

BOYD (Mark F.). **The Significance of the Data collected by Splenic Surveys.**—*Southern Med. Jl.* 1926. May. Vol. 19. No. 5. pp. 392–394.

Boyd has studied for three years a group of four villages in the coastal lowlands of the state of Rio de Janeiro. He is impressed with the necessity of measuring spleens by some method which will roughly express the degree of enlargement in relation to stature, that is its volume, and uses the following classification: spleen not palpable 0; palpable but within costal margin 1; not more than half-way to navel 3; thence to umbilicus 4; beyond umbilicus 5. He corroborates the well-known value of the splenic index, but holds it to be a more accurate measure with *P. vivax* than with *P. falciparum*, advises examination of individuals of all ages, and holds splenomegaly to be a personal indication of those in most need of intensive treatment by quinine. In discussion Dr. MAXCY held that measurement of spleen volume left him unconvinced and that the size of palpable spleens was the most dependable single index available.

C. L.

SINTON (J. A.), assisted by BAILY (J. D.) & CHAND (Diwan). **Studies in Malaria, with Special Reference to Treatment. Part IV. The Occurrence of Sexual Forms of *Plasmodium falciparum* in the Peripheral Circulation.**—*Indian Jl. Med. Res.* 1926. Apr. Vol. 13. No. 4. pp. 895–916. [50 refs.]

A valuable and thoughtful paper. In 1,789 thick film examinations of all fever cases among prisoners, made as soon as fever appeared, the monthly percentage showing crescents from July to February was respectively, 4·3, 3·4, 0·5, 0·9, 10·3, 6·1, 4·4, 0. In 5,886 re-examinations of these men after treatment, the corresponding figures were 4·2, 2,

1·25, 2, 17·2, 8·2, 1·1, 0. There is then a seasonal increase in crescent carriers in November in Lahore, Punjab, India. The sharp rise in November, and not earlier, may, however, need correlation with the fact that "prophylactic quinine" was given once weekly during September and October to all prisoners who were not under treatment or under observation after treatment. The percentage of crescent carriers (equally with that of albuminuria) varies with the number of examinations made; for example, in 1,789 Indians 4·25 per cent. showed crescents on the first examination; in 697 of these examined on numerous subsequent occasions this figure rose to 34·2. But this is not all the story for the first examinations took place immediately fever began; crescents are not seen until 5 to 10 days after a febrile attack. It was found that in treated cases crescents became proportionately more numerous in those who had harboured many asexual parasites than in the opposite condition, though here again the question of detection in sparse infection has to be faced. The matter is put thus: DARLING showed that 12 gametocytes per cmm. of blood were necessary to produce infection in a mosquito; ROSS has calculated that, using a thin film, the examination period for 1/12 cmm. is 1 hour; most workers employ 15 to 20 minutes; accordingly many infective carriers must be missed. The thick film uses 16 to 20 times as much blood as the thin, so that 1/12 cmm. will be examined in 3 or 4 minutes and even a single crescent is unlikely to be overlooked.

The production of crescents is then considered. It is pointed out that BUCHANAN and THOMSON, as well as Sinton's own records, show that crescents develop when asexual forms are plentiful in the blood. It has been shown by many that they mainly develop in the bone marrow, much less frequently in the spleen. The reaction of circulating blood is pH 7·4. ROUS has shown that certain actively metabolic organs, including the spleen, are "acid organs" and it is suggested that stagnant backwaters like the spleen and bone marrow will be more acid, though no evidence regarding the latter is offered. An interesting observation is mentioned. A culture of *P. falciparum* was overlooked for 10 days in an incubator, and when examined was found to contain large numbers of crescents and no asexual forms—although no crescents had been found in the patient's blood nor in the culture during the 72 hours in which it was examined. The point is to be further elucidated in connexion with the hydrogen-ion concentration; since Sinton and BAILY have found a lowered alkali reserve during acute attacks of subtertain malaria, and crescents appear in maximum numbers about 10 days after such a paroyxsm. No correlation was found between splenic enlargement and crescents. The life span of a crescent is considered. If crescents be formed from asexual forms and if asexual forms be killed by quinine, then the further formation of crescents will thus be prevented and the life span of those present will be the measure of the normal life span of the crescent, provided, as seems to be the case, these are unaffected by quinine. This point was determined by treating 591 cases with quinine for 4 to 7 days [*ante*. p. 542] and observing them weekly for 8 weeks. The percentage found harbouring crescents before, during and after the 8 weeks was 6·9, 25·2, 15·6, 8·5, 3·7, 2, 0·7, 0·3, 0·3, 0. It is concluded that, while the life span may reach to 60 days, it is ordinarily 30.

"The presence of crescents after the finish of treatment cannot, therefore, be taken as evidence that the treatment has not cured the infection, unless one believes in the parthenogenetic theory of relapse, which does

not seem to be supported by our results, for, in spite of the fact that no treatment was given during the observation period, no relapse was recorded among 127 of the patients who showed crescents in their blood, even although the majority of these patients were examined weekly for at least five weeks after the crescents could no longer be found."

It is held that the quinine and alkali treatment (this *Bulletin*, Vol. 20, p. 300) gives better results in preventing the formation of crescents than does other treatment, and concluded that, as a practical measure, isolation should continue for 3 weeks after cessation of that treatment.

C. L.

YORKE (Warrington) & WRIGHT (W. Rees). **The Mosquito Infectivity of *P. vivax* after Prolonged Sojourn in the Human Host.**—*Ann. Trop. Med. & Parasit.* 1926. Aug. 13. Vol. 20. No. 3. pp. 327–328.

"In March, 1926, after the strain had been maintained in the human host [G.P. cases] for three and a half years, its capacity to infect *A. maculipennis* was again examined. Forty-seven mosquitos were allowed to feed three times on a patient of the fifty-third passage, and once on a patient of the fifty-fourth passage. Fifteen days after the first feed, the mosquitos were divided into four groups, each of which was fed on a general paralytic; all four patients became infected with malaria. Twenty-three of the mosquitos, which lived for longer than a week after the first feed, were dissected, and of these 19 were found to be infected—3 with oocysts only, and 16 with sporozoites in the salivary glands.

"This observation shows that the strain in question had preserved unimpaired its power to infect mosquitos after 53 or 54 direct passages through man during a period of three and a half years."

C. L.

WITVROUW. Rapport sur études "quinquinas". [**Cinchona Studies.**] —*Bull. Méd. du Katanga.* 1925. Oct. Vol. 2. No. 5. pp. 210–211.

If interpretation upon probable omissions and displacements of decimal points be correct the report is as follows. In 1907, 32 *Cinchona succirubra* trees were planted at Mani and 25 *C. calysaya* at Kinkala. The latter plantation has disappeared, the former contains 17 trees which, by the marks of creepers on the bark, would seem to have been neglected. The total alkaloids seem to have varied from 6·7·82 per cent. and "quinine sulphate" from 2·28 to 3·98 from root and branch bark respectively.

C. L.

DOBSON (W. H.). **Unusual Manifestations of Malaria.**—*China Med. Jl.* 1926. Apr. Vol. 40. No. 4. pp. 366–369.

Three determined attempts at suicide with tertian rhythm were made by a married nullipara of 30 who had not smiled for over a year. They were not repeated after intramuscular quinine; the smile reappeared on the third day. This was perhaps the most striking of these unusual manifestations of malaria. Others were catalepsy, haemorrhagic colitis, purpura haemorrhagica, general haemorrhage, gastralgia and a uterine swelling, reaching halfway to the umbilicus. All were cured by quinine, the diagnosis all being clinical. Over 10,000 intramuscular injections of quinine (5 gr. quinine sulphate, 2½ gr. tartaric acid and distilled water to a syringeful) have been given

with some induration, pain lasting three days. Only one abscess is reported (and that appeared in the immediate neighbourhood of the injection), the skin being swabbed with "equal parts of camphor gum and carbolic acid crystals."

In discussion Marguerite EVERHAM said of cerebral malaria: "Manson is the only authority I have found who speaks of the increased spinal fluid. We have found that a lumbar puncture with removal of an ounce or more of fluid always gives relief." *Cf.* the recent work of CORDES, *ante*, p. 544, who instances striking success by puncture of the cisterna magna to relieve this condition.]

C. L.

BROSIUS (O. T.). **A Report of a Case of Cardiac Malaria.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 127–129.

A heavy subtertian malarial infection in a copious drinker resulted in death with great cardiac weakness and eventual failure. Pericardial adhesions were found to be present, and the heart muscle showed cloudy swelling with very few young rings, one red corpuscle only in 123 being infected.

C. L.

BENHAMOU (Ed.). Le coeur dans le paludisme. [**The Heart in Malaria.**]—*Paris Méd.* 1926. July 3. Year 16. No. 27. pp. 25–28. [Refs. in footnotes.]

Murmurs, lowered arterial tension except for the period of the access, and a slow pulse, the last held typical of malaria, are touched upon, but the lesion which is stressed is a dilated, spherical heart producing back pressure, oedema, enlarged liver, ascites and fluid in the pleura. The treatment for these conditions, if they appear in malaria, is, first in importance, quinine and, next, digitalis given altogether or alternately. The results are striking.

C. L.

SLAUGHTER (William H.). **Symmetrical Gangrene of Malarial Origin.**—*Jl. Amer. Med. Assoc.* 1926. May 22. Vol. 86. No. 21. pp. 1607–1611. [59 refs.]

Symmetrical gangrene, ending in the amputation of the right great toe, occurred in one delirious from a heavy infection, as the blood showed, of subtertian malaria. The urine was smoky but without sugar. Intravenous quinine rapidly checked all symptoms. The methods of causation of gangrene and thrombosis, and the differential diagnosis, are fully discussed.

C. L.

TRABAUD. Quelques considérations à propos d'un cas de polynévrite d'origine palustre. [**A Case of Polyneuritis of Malarial Origin.**]—*Rev. Méd. et Hyg. Trop.* 1926. Mar.–Apr. Vol. 18. No. 2. pp. 33–36.

Noting that the literature would suggest that nerve manifestations of malaria rank in commonness with visceral ones, but that the number

of reported cases of affection of peripheral nerves appears to be only 73. Trabaud describes a case of refractory sciatica, without diabetes or visceral enlargement, with minute traces in the urine of albumin and urobilin, and with crippling sudden pain extending from the sacro-sciatic notch to the popliteal space. There were no objective nerve signs. The patient had been stationed in intensely malarious parts without any suggestion of malarial illness, but had been taking 25 cgm. of quinine daily. *P. vivax* was present in the blood. 2 gm. [30 gr.] of quinine daily by mouth for 20 days and 30 cgm. of neosalvarsan intravenously every four days suppressed the attacks, but several of these treatments were required for complete cure.

C. L.

KARVE (S. D.). **Malarial Pneumonia.** *Kenya Med. Jl.* 1926. July. Vol. 3. No. 4. pp. 116–118. With 1 plate.

Primary malarial pneumonia is held to be characterized by slight dullness usually left-sided, enlarged spleen, diminution of breath sounds, prostration, a slightly blood-tinged sputum and an increased pulse-respiration ratio, and to be cured by quinine; the prognosis is better than in true lobar pneumonia. Secondary malarial pneumonia shows dull patches with loud moist râles, the cough is very difficult to relieve and the prognosis good.

C. L.

INHELDER (Heinrich E.). Malaria und Gravidität. [**Malaria and Pregnancy.**] *Arch. f. Schiffs- u. Trop.-Hyg.* 1926. June 1. Vol. 30. No. 6. pp. 251–252.

Inhelder was questioned by a Chinese medical man regarding a Chinese woman, eight months pregnant, suffering from typical clinical malaria, who died of post partum haemorrhage the day after administration of 1 gm. 15 grs. of quinine in five doses. He recounts two cases in his own practice of subtertian malaria with pregnancy at the 7th and 8th months treated with a combination of 20 to 30 drops of tincture of opium and 0·2 gm. of quinine hydrochloride, the total daily dose of quinine being 1 gm. and being continued for three days. Both women went to term.

C. L.

RAGAIN. Sur un cas de paludisme type malariae chez un nourrisson de deux mois. **Case of *P. malariae* Infection in an Infant.** *Rev. Méd. et Hyg. Trop.* 1926. Mar.–Apr. Vol. 18. No. 2. pp. 45–46.

The two months old nursling of a mother infected with *P. malariae* began to show evidence of illness due to the same parasite, and was cured by tannate of quinine and stovarsol on alternate days. It is held that mosquito bites produce such evident lesions in an infant that their non-detection is evidence of their absence, and that the infection was either congenital or transmitted in the milk.

C. L.

ALLEN (George P. F.). **Some Post-Mortem Observations on Twenty-Six Cases of Subtertian Malaria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1926. Mar. 18 & May 20. Vol. 20. Nos. 1 & 2. pp. 119–122.

Of these 26 cases in Jamaica half occurred during December and January. In 23 the parasite was detected in the spleen, liver and brain at the autopsy. In twelve of them there was definite evidence of kidney disease—fatty change in the organ; in one, the only cachexial case, diffuse cortical haemorrhage. Four cases presented enlargement, with easy stripping of the capsule, firmness, little differentiation of cortex and medulla, and a greasy surface. The cells lining the tubules showed marked granular degeneration and the lumen might be filled with granular débris. Large mononuclear cells were frequent in the interstitial tissue, particularly where tubular degeneration was least marked. Malarial pigment was present, especially in the glomerular tufts, the squamous epithelium being absent in many malpighian corpuscles. This large grey degenerate kidney occurred in no other than malaria cases. Parasites were not found in the suprarenals in two with marked asthenia. Spontaneous rupture of the spleen occurred in one case and this organ was absent in another, being represented by three small nodules, the largest having a diameter of $\frac{3}{4}$ inch. The pulp of these spleniculi contained many subtertian parasites.

C. L.

MOUFELL (P. P.). L'influence sur le cours de la malaria d'une infestation vermineuse. **Influence on Malaria of Helminthic Infestation.**]—*Russian Jl. Trop. Med.* 1926. No. 5. French summary p. 78. [In Russian.]

Examination of 1,060 malarial cases by FULLEBORN's method [presumably his flotation one] showed ova of intestinal worms in 35 per cent. and eosinophilia in 35 per cent. The records of helminthic invasion [or, more accurately, the detection of the presence of eggs] in chronic malarial cases did not authorize the conclusion that helminthiasis predisposes to chronic malaria, but disinfestation might be followed by very favourable malarial results.

C. L.

PETERSEN (William F.). **Blood Sugar during the Crisis of Malarial Fever.**—*Proc. Soc. Experim. Biol. & Med.* 1926. May. Vol. 23. No. 8. pp. 753–754. [3 refs.]

"In the fasting patient we have determined that the period of the chill and rise in temperature is associated with a decrease in the blood sugar level. This corresponds to the time of a peripheral leukopenia and a diminished concentration of blood protein. With the crisis and fall in temperature, blood sugar increases, leukocytes increase in the peripheral blood stream and the blood proteins increase."

C. L.

COLLINS (R. K.). **An Experience with Intensive Quinin Treatment under Field Conditions.**—*Southern Med. Jl.* 1926. May. Vol. 19. No. 5. pp. 383–392. With 11 charts in text.

This paper reports a continuation of work begun at Lessburg, Georgia, by DARLING in 1924 and completed by BOYD in 1925. The year 1925

was quite exceptional in that during ten days of January almost one-third of the normal yearly precipitation fell, followed by an unprecedented drought, so that there were weeks during the malaria season when the catch of *A. quadrimaculatus* was nil. Under these conditions the standard treatment by quinine sulphate, recommended by the National Malaria Committee and associated with the name of BASS, was given for 12 weeks from February 9th to May 7th, 1925, to 54 children, under conditions which seemed to ensure swallowing. The dosage was —2 years, 2 gr.; 3–4 years, 3 gr.; 5–7 years, 4 gr.; 8–10 years, 6 gr.; 11–14 years, 8 gr. There were 15 untreated controls, taken so far as possible from the same households as the treated. Of the 54 (53) treated, 25 were given the indicated dose once daily and 28 the dose once every other day. Examinations were made on the day of treatment and every 28 days thereafter till July 30th, that of the blood being by a single thin film examined for 20 minutes before a negative result was returned. In all those taking the full treatment parasites, which had been present in some 50 per cent. on February 9th, disappeared completely, and were first met with again on July 2nd in what (in the diagram) probably represents one case and apparently in three more on July 30th, while in those taking half doses it would seem that one, two or three showed parasites throughout treatment and four by July 30th. The average haemoglobin was but little affected. Believing then that these reappearances after treatment are relapses the writer concludes :—

"The use of the standard treatment as recommended is of definite benefit during its administration, but it has been shown insufficient to effect a cure in chronic cases. To be effectively administered the method demands strict and expensive supervision. Therefore the experiment would seem to indicate that the standard treatment cannot be recommended as a public health measure."

In discussion GRIFFITH said the experience in Alabama was that the standard treatment failed in 25 per cent. of patients, who were generally poorly nourished. KELLER attributed the Louisiana malarial improvement largely to quinine. FORT backed Collins' belief that reinfection was absent in this experiment. In reply Collins estimated that only 5 to 10 per cent. persisted with the treatment to the end, and that under such conditions it must fail in its effect.

C. L.

ROW (Y. S.). **A Case of Malignant Tertian Malaria treated with Intravenous Quinine.** *Indian Med. Gaz.* 1926. May. Vol. 61. No. 5. pp. 231–232.

In spite of continuously "getting" quinine sulphate by mouth, 10 grains twice daily, this prisoner showed persistent relapses of subtertian malaria, microscopically established, nor did intramuscular quinine disinfest. Quinine bihydrochloride intravenously, three times on alternate days in 7 grain doses, was followed by freedom from recurrence persisting 7½ months. Whether the urine was tested for quinine during the oral administration is not noted.

C. L.

BERKELEY-HILL (O. A. R.). **Notes on the Treatment of Benign Tertian Malaria with Cinchona Febrifuge.** *Indian Med. Gaz.* 1926. July. Vol. 61. No. 7. pp. 332–334. [3 refs.]

The treatment advocated by ACTON and KNOWLES (1924) [this *Bulletin*, Vol. 21, p. 602] was tried in the Ranchi European Mental

Hospital, which lies at 2,200 feet, with very little indigenous malaria. It consists of :—

Pulv. cinchona febrifuge (Mungpoo)...	gr. x.
Pulv. acidi citrici	gr. xx.
Magnesii sulphatis	gr. xxx.
Extracti glycerrhizae liquidi ...	dr. 1.
Spir. chloroformi	m. x.
Aquam ad.	oz. 1.

This dosage is continued three times a day for seven days, and twice a day for a further 24 days. All cases considered were of *P. vivax* infection. The relapse rate in 43 cases was 14 per cent. only. Some patients could not retain the mixture. In others it caused diarrhoea even when the magnesium sulphate was omitted. Berkeley-Hill writes that ACTON now prescribes as follows :—

Pulv. cinchona febrifuge	gr. x.
Pulv. acidi citrici	gr. xx.
Magnesii sulphatis	gr. x ad gr. xv.
Spiriti anisi	m. x.
Syrupi simplicis et Aq.	āā oz. i.

C. L.

BAQUÉ (L.), CÉARD (L.), DEKESTER (M.) & MELNOTTE (P.). Essais de traitement du paludisme par la cinchonine. [**Treatment of Malaria by Cinchonine.**]—*Arch. Inst. Pasteur d'Algérie.* 1925. Dec. Vol. 3. No. 4. pp. 352–358. With 10 charts.

A report on 22 persons indicates that cinchonine is as effective as quinine for the temporary cure of malaria caused by *P. vivax* and *P. falciparum* infections and as well supported. The cases could not be followed up.

C. L.

CLARK (H. C.). **A Malaria Survey of the Tela Railroad Company Farms and the Results of our Treatment of Malaria in the Farm Camps.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 187–196. [2 refs.]

The drugs tested were quinine, stovarsol and Aiken's tonic pill whose composition is not noted. The impression is that " stovarsol has little, if any, effect either on malaria, as a prophylactic measure, or in acute malarial fever as a therapeutic measure " no distinction being drawn between tertian and subtertian malaria. Of 774 positives treated with 30 gr. of quinine daily for 14 days, only five were admitted to hospital during the 14 days following cessation of treatment.

C. L.

BOYÉ (R.). Action comparative du stovarsolate et du chlorhydrate de quinine dans la fièvre quarte paludéenne. [**Comparative Effect of Stovarsolate and Hydrochlorate of Quinine in Quartan.**]—*C. R. Acad. Sci.* 1926. July 26. Vol. 183. No. 4. pp. 325–326.

Stovarsolate of quinine contains 54·9 per cent. of base, the hydrochloride 82 per cent. They were compared on *P. malariae* in single doses corresponding roughly to these proportions, those of the stovarsolate being 1, 1·5 and 2 gm. Three days after taking the largest dose,

parasites were reduced by 85–90 per cent. in the stovarsolate case, and not at all in the quinine one. Again the stovarsolate was given in 1 gm. doses daily till parasites disappeared from the cutaneous blood; this occurred in 6, 6, and 4 days. For 0·5 gm. of quinine the figures were 11, 16, 16.

C. L.

VALENTI (Fr.) & TOMASELLI (A.). Lo stovarsolo nella cura della malaria. [**Stovarsol in the Cure of Malaria.**]—*Gazz. d. Osped. e d. Clin.* 1926. Mar. 21. Vol. 47. No. 12. pp. 267–270. [5 refs.]

From the Institute of Clinical Medicine of the University of Catania, whose director is Professor FELETTI, the originator of the use of stovarsol for malaria, the writers report 6 cases of *P. vivax* infection all cured by stovarsol orally, generally in doses of 2 tablets daily; 2 infections of *P. malariae* with 1 cure; and 5 of *P. falciparum* with 2 cures. In one of these last "cures" subtertian rings persisted abundantly for a month and he was supposed to have been completely cured in 2½ months. In the other 3 cases quinine had to be given on account of grave symptoms.

C. L.

VIALATTE (Ch.). Sur le traitement du paludisme à *Pl. vivax* par le stovarsol. [**Treatment of *P. vivax* Infection by Stovarsol.**]—*Bull. Soc. Path. Exot.* 1926. May 12. Vol. 19. No. 5. pp. 359–373. With 9 charts in text. [15 refs.]

The writer reports 47 adults treated with stovarsol for infection with *P. vivax*. He shows first a chart of a case clearing up clinically and microscopically without any treatment at all. Ordinarily stovarsol was given by mouth in tablets—1 gm. daily for 4 days—a 5 or 6 days interval, and repetition of the course and interval. It caused disappearance of parasites from the peripheral blood without any particular selection for pigmented forms or gametes. Sometimes sodium stovarsol in 1 gm. doses was given intravenously. If the course comprised less than 16 gm. of stovarsol, relapse occurred, and in two cases an infection with *P. falciparum* appeared after the cure of *P. vivax* infection. It is pointed out that the toxic effects which have followed stovarsol are colic, diarrhœa, erythema, urticaria, optic atrophy, tachycardia, vertigo, collapse. In his 47 cases he had one of acute erythema after 4·5 gms., disappearing in a few days, but reappearing when the stovarsol was resumed. He had also two cases of glycosuria which he can refer less definitely to the drug. Stovarsol is then held to have on *P. vivax* a curative effect about equal to that of quinine; and the importance of this matter is held to lie in its being a first step in the process of obtaining some drug active against all malaria parasites, a discovery which is an imperative economic necessity.

C. L.

BASS (C. C.). **Observations on the Treatment of Malaria with Stovarsol.**—*Southern Med. Jl.* 1926. May. Vol. 19. No. 5. pp. 381–383. [7 refs.]

It is pointed out that in testing a drug supposedly curative in malaria it is essential that the good effects produced by rest in bed should not be attributed to the action of the drug. Moreover in New Orleans the

opportunity of studying malaria in mass seems to have passed for ever. Accordingly, only two cases are reported. The first was an ambulatory one of quartan malaria. He received stovarsol by mouth, 0·25 gm. three times daily, without change in the parasites. Quinine sulphate 30 gr. daily removed all parasites within 48 hours. The second was a benign tertian case, in which parasites disappeared 48 hours after administration of stovarsol. The comment on the latter is—" We debated whether it [stovarsol] should be started at the time, feeling apprehensive that the symptoms were about to stop, and that spontaneous improvement was occurring ". In discussion, Dr. Enrique Martinez CARRANZA noted that mercurochrome had in his hands failed to relieve malarial infection.

C. L.

SINTON (J. A.), assisted by EATE (S. N.). **Studies in Malaria, with Special Reference to Treatment. Part V. The Oral Administration of Stovarsol in the Treatment of Tertian Malaria.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 227–234. [16 refs.]

The patients were relapsing European soldiers in a hill station in India where reinfection could be excluded. They fall into six categories. (1) Ten were treated with stovarsol 3 gm. [48 gr.] in a single 1 gm. dose for three days; (2) 18 with stovarsol as noted, and also with a quinine and alkali treatment during the first and third weeks—stovarsol 3 gm., quinine 27 gm. [420 gr.]; (3) 14 with stovarsol, and with quinine with alkali, during the first and third weeks—stovarsol 6 gm., quinine 27 gm.; (4) five cases with stovarsol in the first week, and quinine without alkali for the first week—3 and 27 gm.; (5) 25 controls with quinine and alkali and (6) 24 controls with quinine only. Of (1) 100 per cent. relapsed. For the rest, the possible maximum and the observed minimum percentages of relapse were: (2) 77·7, 66·6; (3) 71·4; (4) 60; (5) 72, 60; (6) 73·4, 66·6. The average number of previous relapses in the experimental cases was nine and in the controls six. The blood of all in the experimental series was examined by thick film daily before the administration of stovarsol, and thereafter hourly for ten hours. Parasites were found—after 24 hours in all 49, after 28 and 34 hours in 47, in 48 hours in 6, in 50 hours in none. It is believed, from the experience, that stovarsol may provoke or at least accentuate febrile attacks.

C. L.

MAZZA (Salvador), COSSIO (Rufino) & AYBAR ALBARRACIN (A.). Algunos resultados del tratamiento del paludismo por el Stovarsol sódico intravenoso. **Treatment of Malaria by Intravenous Sodium Stovarsol.**—*Bol. Inst. Clin. Quirurg.* Buenos Aires. 1926. Apr. No. 11. 7 pp. With 3 charts in text.

In 17 cases a single intravenous injection of 1 gm. of sodium stovarsol sterilized a single tertian infection, and in one case, two injections " sterilized " a double one. The term " sterilized " denotes, however, in this instance merely that the parasites did not reappear in the peripheral blood during a maximum observation period of one month.

C. L.

TOSHYU (Kaku). **On the Effect of Hydrochloric Sinomenine against Malaria.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1926. Jan. No. 250. English summary p. 8. [In Japanese.]

This drug would seem to be the active principle of *Sinomenium diversifolium* (Menispermaceae). The daily dose given was 0·2-0·4 gm., in three portions. Plasmodia disappeared in 2-9 days. There has been no recurrence for 7 months. Its use is recommended in place of quinine, "as it has no disagreeable secondary effect on man". These conclusions are based on 12 cases only, comprising all three species of plasmodium.

C. L.

REITLER (Rud.). Ueber die Behandlung der Malaria mit Cadmiumpräparaten. **Treatment of Malaria with Cadmium Preparations.**—*Wien. Klin. Woch.* 1926. Aug. 12. Vol. 39. No. 33. pp. 949-950.

The search for some substitute for quinine, which its high cost instigates, has led to the trial of 716 B. of Heyden, a solution of cadmium sodium tartrate containing 1 per cent. of cadmium for intravenous use, and a cadmium subsalicylate in oil with 5 per cent. of cadmium for intramuscular use. Although the report was issued after an observation period of 12 to 30 days, there were relapses within that period. The dosage was 0·5 cc. twice weekly. The injections were so painful that four were apparently as many as anyone accepted.

C. L.

SULDEY (E. W.). Du traitement du paludisme par la Smalarina Cremonese. **Treatment of Malaria by Smalarina.**—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 431-435.

At the recent Congress on malaria at Rome there arose the question of an experiment made in the French Sudan by an Italian Mission composed of Prof. PERONI and Dr. CIRILLO in June, July and August, 1925, with the collaboration and control of the laboratory of Bamako. The following is the laboratory report:—

Forty children were treated by Prof. PERONI himself for a month, exactly as prescribed in the pamphlet in four languages which accompanies the drug. The conclusions reached are sufficiently emphatic, namely, that smalarina has no curative action on the plasmodia, no action in reducing the spleen, no action in preventing reinfections, no action in avoiding relapses. "This conclusion is absolute if one takes for guide the capital sign of malaria, the presence of the plasmodium in the blood, which Professor PERONI has simply forgotten to mention in his communication."

C. L.

NIKOLAJVIĆ (Bor.). Die Behandlung von Malaria mit Peracrina. [**Treatment of Malaria by Peracrina.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. July 1. Vol. 30. No. 7. pp. 289-293. [6 refs.]

From an experience of 10 cases, 9 of *P. vivax* and 1 of *P. falciparum*, the writer is unconvinced of the value of peracrina in malaria, but holds

that it is an excellent provocative agent and should be combined with quinine and neosalvarsan in cases where a provocative influence is desired.

C. L.

LARGE (D. T. M.) & BONAVIA (V. J.). **Carbolic Acid in Malaria.**—*Jl. Roy. Army Med. Corps.* 1926. June. Vol. 46. No. 6. pp. 449–450.

Three cases of subtertian malaria were treated with quinine till fever disappeared, 30 gr. daily for 3–7 days and then with Tr. iodi. and acid. carbolic aa m 2 t.d.s. for 10 to 14 days. One case relapsed under the treatment. In all, crescents persisted although they "were distinctly fewer at the end of the treatment, but it is probable that the rest while in hospital and the nourishing diet played their part in the reduction." [See SINTON, p. 813 *supra.*]

C. L.

COUTO (Miguel). Betrachtungen und Erfahrungen ueber Beriberi und Malaria. [**Observations and Experiences in Beriberi and Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. July 1. Vol. 30. No. 7. pp. 275–284.

The conclusion of this discourse, as regards malaria, is that in tertian malaria quinine and methylene blue are equally effective, and that where the infection is refractory to one the other should be substituted. In subtertian malaria they should be combined intravenously from the beginning. No evidence is offered.

C. L.

CORDES (Wilhelm). **A Contribution to the Therapy of Cerebral Malaria.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 197–201.

It may be of value to English readers to consult in their own language a paper on the importance of decompression in cerebral malaria by puncture of the cisterna magna. The substance has already been dealt with in this *Bulletin* (*ante*, p. 544) in abstracting a paper by the same author.

C. L.

HUGHES (T. A.). **The Origin of Urobilin in Persons who have suffered from Chronic Malaria.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 157–169. [19 refs.]

The investigations recorded, evidently independently conceived, are on the same lines as those of KINGSBURY (*ante*, p. 533). They lead to the conclusion that in uncomplicated chronic malaria with latent haemolytic jaundice there is no relationship between urobilinuria and bilirubinaemia. In chronic malaria with toxic jaundice urobilin disappears from the urine when the condition of the glandular cells of the liver is such that bile pigment does not enter the bowel.

C. L.

LUKOWA (A. J.). Halbmondkörper bei Malaria. [**"Crescents" in Malaria.**] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. May 1. Vol. 30. No. 5. pp. 183–188. With 9 text figs.

The term crescent as used by the writer does not apply to the gametocytes of *P. falciparum* but to certain pale bodies with a rim often holding Schuffner's *dots*, which, if the writer be really tied to the heavens for simile, he would better term annular eclipses. They appear to be erythrocytes, and may or may not contain malaria parasites. Four cases are discussed, three in infants, the peculiar normal blood picture at this stage of life being without mention. The writer notes that these bodies have been explained as artefacts. The figures seem to the reviewer to give little help in their elucidation. No effort at wet staining was made, the preparations being evidently thin smears stained with Giemsa.

C. L.

LLOYD (R. B.) & MITRA (G. C.). **The Wassermann Reaction in Malaria.** —*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 135–144. [30 refs.]

The Imperial and Assistant Serologists discuss the literature upon the Wassermann reaction in malaria. They use a sensitive system, putting up each serum against three antigens– (1) cholesterinized alcoholic; (2) Bordet's; (3) cholesterinized Bordet's, when estimating the effect of treatment. In 85 cases of malaria the results were: fully positive 4, partially positive 8, negative 61, incomplete negative 12. Only one of the twelve positive cases gave a definite history of syphilis. It is, however, held that 14 per cent. is well within the syphilis rate of Calcutta, so that there is no evidence that in the positive malaria cases the positive reaction was due to malaria.

C. L.

RADOSAVLJEVIĆ (A.) & RISTIĆ (L.). Ergebnisse der Senkungsreaktion und der Bluteiweissbestimmung bei Malaria. [**Sedimentation Reaction and Determination of Blood Albumin in Malaria.**] —*Ztschr. f. d. gesamte experim. Med.* 1926. June 30. Vol. 51. Nos. 1–2. pp. 48–80. With 11 text figs. [21 refs.]

Active malaria is characterized by an acceleration of sinking of blood corpuscles in citrated blood which, as the activity continues, reaches a maximum, varying in each case, and returns to normal if the latent period be sufficiently long. This change results from the cumulative effect of the different paroxysms; at the height of each there is indeed a relative lengthening of the velocity of precipitation, an increase in the fibrinogen and an absolute decrease in the total albumin, but during the apyrexial period the process is reversed, so that the rate of sinkage is more rapid than it originally was, accompanied by a relative increase of the total albumin and a relative lessening of the fibrinogen. In malaria, quinine and neosalvarsan produce a rapid return to normal conditions corresponding sufficiently to the disappearance of parasites. Methylene blue, peracrina and hydrochloric acid have no such influence nor has quinine in cases other than malaria. The writers suggest that there is here a practical means of diagnosing malaria.

C. L.

SAVTCHENKO (J. G.) & BARONOFF (J. M.). [De la spécificité de la réaction de fixation dans le paludisme.] [**Specificity of Fixation Reaction in Malaria.**]—*Jl. Méd. de Kazan.* 1925. No. 25. pp. 1011–1021. [Summarized in *Bull. Inst. Pasteur.* 1926. July 31. Vol. 24. No. 14. pp. 620–621.]

Liver extract is used for antigen and syphilitic reactions are excluded. Antigen coming from one with subtertian rings fixes complement only in those presenting these rings and not in those presenting gametocytes; and *vice versa*. Neither antigen reacts with tertian malaria. Antigen coming from one with tertian gametocytes and schizonts acts strongly upon chronic gametocyte carriers, less strongly in recent attacks and not at all with subtertian malaria.

C. L.

GRANT (A. R.) & SILVERSTON (J. D.). **The Whittingham (W) Strain of Artificially Induced Malaria. Observations made during the Treatment of General Paralysis and Tabes Dorsalis.**—*Jl. Trop. Med. & Hyg.* 1926. Apr. 15. Vol. 29. No. 8. pp. 117–122. With 2 charts in text. [14 refs.] Also in *Jl. Mental Sci.* 1926. July. Vol. 72. No. 298. pp.346–355. [14 refs.]

The full story of this strain is told. Obtained from a *P. vivax* infection acquired in India, it has passed through 60 direct transmissions over 3½ years covering 150 cases. Infection has been by subcutaneous injection of about 2 cc. of infected venous blood. Morphologically, in over 10,000 films taken at all stages of the cycle, the parasite has retained its natural form and character throughout the period. The trophozoite was the form commonly appearing first, usually after, sometimes coincident with, and occasionally 2–4 days before fever occurred. Parasites reached their maximum in cutaneous blood about the 6th or 10th day of illness, diminution in numbers, amounting even to complete disappearance, being then the rule. Seven trophozoites, and the recognized combinations of sexual and asexual forms, have occurred in one red corpuscle. The clinical and clinical-pathological findings showed an irregular pyrexia preceding the invariably occurring rigors and frank attacks. Quotidian fever has throughout been the commonest type, but a pure tertian type is increasing in frequency. Temperature in early cases reached 103·6°–106·2°, and at the present time varies between 105° and 107·2°. Of 500 paroxysms during winter, 81·4 per cent. occurred between 7 a.m. and 7 p.m., and 85·2 per cent. of them between 11 a.m. and 3 p.m. irrespective of the time of inoculation, with the maximum at 2 p.m.; during summer time the corresponding figures are 74·7 per cent. and the maximum hours 2–5 p.m. The attacks were not necessarily regular—for instance, one case showed 5 tertian rigors, 5 apyrexial days and 7 quotidian rigors stopped by quinine. Spontaneous disappearance of parasites was, as usual, observed in certain cases. Gastro-enteritis with vomiting and diarrhoea, was occasional. Clinical jaundice with bile in the urine occurred in four cases, later than the 5th and generally after the 7th paroxysm; was of grave prognostic import and called for immediate treatment. Urobilinogen was slightly, but infrequently, increased. Albuminuria was common, usually a trace only, but in two cases was decidedly increased with constitutional reactions calling for immediate treatment of malaria. Anaemia was usually mild, clearing up within a week of instituting quinine treatment. In one in which it did not, the blood picture closely simulated pernicious anaemia; under oral and intravenous arsenic, conditions became normal in a fortnight.

Treatment was by 30 gr. of quinine on three consecutive days. The first dose produced an extraordinary diminution in parasites, and susceptibility of the parasites was so great as to render mere control of the fever impossible. Reinfection, 22 days to 19 months after cure, was successful in all cases, judged by the appearance of parasites in the blood, though paroxysms occurred in 58·8 per cent. only, so that an immunity [or tolerance] was established with its maximum at about 12 months. Relapses occurred in less than 2 per cent. of cases, in one case after 90 and in the other after 60 gr., disinfestation being apparently effected after a second 90 gr. course.

C. L.

PIJPER (Adrianus) & RUSSELL (Elizabeth D.). **Malaria Treatment of General Paralysis: a Report on 44 Cases.**—*S. African Med. Rec.* 1926. July 10. Vol. 24. No. 13. pp. 292–305. [91 refs.]

This paper deals mainly with neurological aspects. A pure *P. vivax* infection was obtained only with difficulty. Forty-four cases were treated in mosquito-proof wards. "There is nothing to be gained by employing mosquitoes, and very often this does not even work." 0·5 to 20 cc. of blood was injected subcutaneously over a wide area with vigorous massage. The incubation period varied from 3–24 days. In 14 cases there occurred Korteweg's initial fever. It was aimed to allow 12 to 16 paroxysms, the blood being regularly examined. If these ceased they could sometimes be reintroduced by injection of 0·5 to 1 cc. of liq. adrenalin. An injection of 0·6 gm. neosalvarsan was always given whether the fever had ceased spontaneously or not; parasites could not be found 36 hours later. This dose was repeated a week later, the patient being confined to bed from the inoculation to the final neosalvarsan injection. No quinine was given. No relapse occurred. There were 11 deaths, 11 complete mental remissions, 11 mental improvements and 11 physical improvements in 44 cases detailed in a table.

C. L.

DUNNE (J.). **The Malarial Treatment of General Paralysis.**—*Jl. Mental Sci.* 1926. July. Vol. 72. No. 298. pp. 343–346.

Infection was by subcutaneous injection of 2 to 4 cc. of defibrinated blood, the incubation period varying between 7 and 14 days and being shorter with the larger dose. Of 35 injections, two failed entirely; some patients required several injections (one 4). Malarial attacks were tertian in rhythm. Fever disappeared after six rigors in three-fourths of the cases. After quinine treatment the majority of these were reinfected, with, in general, "spontaneous recovery after three or four rigors." Mentally, eight greatly improved and seven slightly. Five died (pneumonia one, epileptiform seizures two, dementia two). Of three subsequently examined, one showed spirochaetes. The ease with which the malaria can be controlled is noted; the dose of quinine is stated merely as 10 gr. thrice daily.

C. L.

ELLERY (Reg. S.). **On the Treatment of General Paralysis of the Insane by Malaria.** *Med. Jl. Australia.* 1926. Apr. 10. 13th Year. Vol. 1. No. 15. pp. 401–404. [5 refs.]

Of six patients two died, one of convulsions after the third malarial paroxysm and one of pneumonia showing itself after the first rigor. Three were discharged from the mental hospital to ordinary life. Treatment was by 45 grains of quinine, 5 gr. three times a day for three days. One of the four survivors relapsed malarially.

C. L.

PFISTER (O.). Ueber Malariabehandlung der Progressiven Paralyse. [**Malaria Treatment of G. P.**]—*Schweiz. Med. Woch.* 1926. May 1. No. 17. pp. 391–393.

In 36 cases of general paralysis treated by induced malaria, of which 10 were women, death occurred in four. One died of blackwater fever uninfluenced by quinine or other means, two of heart failure one after the 5th and another after the 12th attack; the last of embolism of a coronary artery.

C. L.

KLING (C.). Le traitement par le paludisme de certaines affections du système nerveux constitue t'il un danger de la propagation du contage? [**In Treatment by Malaria is there Danger of Spread of Infection?**]—*Semana Méd.* 1926. June 3. Vol. 33. No. 22 (1690). pp. 1217–1219.

In 1923 KJALLMARK started a strain of *P. vivax* at Upsala, Sweden, for the treatment of general paralysis. It has passed by inoculation through 150 persons, there being 30 direct passages. Gametocytes became more and more rare but were noted again in the autumn of 1925. These malaria cases were kept in screened wards; nevertheless anopheles were found within these wards, so that protection was incomplete. Anopheles were particularly plentiful in the surroundings of the hospital in July and August 1925, and in August two cases of infection with *P. vivax* appeared within 10 days of one another in a ward in which no case of malaria had lived for six months, but situated within 100 metres of one in which the malarial treatment of general paralysis was being carried out. The last malarial epidemic in Sweden was in 1887, and during the last five years there have only been five indigenous cases of malaria in the country. These two cases proved very refractory to quinine, continuing infected for a year; which is held to show that the plasmodial race, usually so amenable to quinine, had augmented its virulence by a single mosquito passage. In the autumn of 1924 *A. maculipennis* was infected from this almost gameteless strain and passed on the infection to another person. The need for precautions against spreading malaria used by inoculation to treat general paralysis is pointed out.

C. L.

MÖRCH (J. R.). Das Verhältnis einiger Seroreaktionen während der Behandlung von Paralyse mit Malaria tertiana. [**Seroreactions Compared during the Treatment of G. P. with Malaria.** — *Deut. Med. Woch.* 1926. Apr. 30. Vol. 52. No. 18. pp. 740–742. [8 refs.]

The Wassermann and Sigma reactions were tested in a number of general paralytics before injection with benign tertian malaria, after five attacks, after ten attacks, and later up to six months. The controls were a number of non-syphilitic mental cases, mostly dementia precox, all negative to both tests before treatment. Of these 11 controls, malaria induced a + Wassermann reaction in 10 and a positive Sigma reaction in 2. Of the 65 paralytics, 19 showed no serum reaction before, but a positive reaction appeared after malaria; in 18 it was positive to the Wassermann test and in 6 to the Sigma. The rest showed reactions before treatment, which in 26 were not increased and in 20 were increased by treatment. The Wassermann antigen was extract of calf's heart + of human heart or of syphilitic liver, all giving identical results. The Sigma reaction is the precipitin reaction of Dreyer-Ward. Malarial injection was by 4 cc. of venous blood drawn between febrile attacks of benign tertian malaria, injected apparently subcutaneously. Incubation periods averaged 14 days and varied from 6–21. Quinine treatment was by three daily doses of 0.25 gm. [4 gr. each, with various intermissions, and was continued for 1–3 months. The disinfestant results are unstated.

C. L.

FLEMING (G. W. T. H.). **A Note on the Boltz Test in the Cerebro-Spinal Fluid after Malarial Therapy in General Paralysis.**— *Jl. Mental Sci.* 1926. July. Vol. 72. No. 298. p. 376.

The Boltz test* is not due to cholesterol but apparently to some combination or modification of this. It is almost invariably positive in general paralytics and negative in other psychoses. Of ten cases, nine positive previous to the malaria became negative afterwards, while one previously negative became positive.

C. L.

MAURIAC (Pierre). Les véritables promoteurs du traitement de la paralysie générale par le paludisme. **The True Promoters of the Treatment of G.P. by Malaria.**]— *Jl. Méd. de Bordeaux.* 1926. Apr. 25. Vol. 103. No. 8. pp. 322–324. [1 ref.]

Between HIPPOCRATES's "Quartana ab aliis magnis morbis vindicat" and VON JAUREGG's malarial treatment of general paralysis Mauriac interposes the "very serio-comic" work of MÉNAPE (1561), who lauds quartan as a dissipator of bile and a curer of the tyrannical melancholia, generous, a liberator and the deadly and implacable enemy of convulsions, and LEGRAIN (1913) who advised quartan blood intravenously, or a cachet of the clot swallowed, as curative of grave affections generally incurable —eczema, chronic suppuration, hepatic syphilis, lupus, leprosy, inoperable cancer. It really seems astonishing that anyone ever dies in the tropics.

C. L.

* Place 1 cc. of spinal fluid in a Wassermann test tube; add 0·3 cc. of acetic anhydride drop by drop; shake; add 0·8 cc. of concentrated sulphuric acid drop by drop; shake; examine against a white background after 5 minutes. A blue tinge (blue pink or lilac) is positive.

BARNHOORN (J. A. J.). Een zeer gunstig afgeloopen malaria-behandeling bij dementia paralytica. [**A Very Favourable Result in the Malarial Treatment of Dementia paralytica.**]—*Nederl. Tijdschr. v. Geneesk.* 1926. Apr. 17. 70th Year. 1st Half. No. 16. pp. 1615–1617.

DE JONGH (J.). Malaria behandeling bij dementia paralytica. [**Malarial Treatment of Dementia paralytica.**]—*Ibid.* May 22. No. 21. pp. 2083–2084.

Diarrhoea appeared in the single case reported by Barnhoorn as treated with malaria for general paralysis. De Jongh reports seven cases of this treatment. Infection was by injection. They are without malarial interest.

C. L.

SERGENT (Edmond & Etienne). Critique des méthodes antipaludiques. [**Critique of Antimalarial Methods.**]—*Semana Méd.* 1926. Apr. 22. Vol. 33. No. 16 (1684). pp. 828–835. [7 refs.]

In the nature of things this paper covers much familiar ground. Retrogression of malaria may be due to the healing effects of prosperity or to the application of measures directed more definitely against the plasmodia, to action taken affecting the soil or the seed. The principles and details—with the advantages and disadvantages as they concern the traveller or settler whether single, in groups or in armies—are considered. Regarding isolation, as for instance of Europeans from fatalistic natives, a mosquito flight of 2 km. is taken as the distance required between the former and larval breeding places or indigenous inhabitants.

For prophylactic quinine the standpoint taken is that it is unknown whether quinine in the blood prevents or cures infection. It is, however, tacitly assumed that it is quinine which is the curative antiplasmodial agent and that taken daily at the evening meal it is in greatest concentration in the blood when most required. The dose advocated is 0·4 gm., and half that quantity in children of 4–12 years. The advantages claimed are the prevention of grave attacks, the infection being strangled or at least rendered latent, and the production of immunity to reinoculation, that is to say acclimatization without risk. A very significant remark is quoted from General LEBLOIS commanding the French Eastern Army in 1917: "There is no military necessity which can oblige a commander to lose men by illness, that is to say, without inflicting loss on the enemy." For an army, it is held that quinine should be regarded as a ration and that it must be controlled by urinary examination. Antilarval measures are divided into those which remove useless, non-domestic water and those which disinfect useful domestic water. The engineer who removes the former works equally in the interests of hygienic and economic progress, but the drainage canal he makes is as definitely a breeding place as the marsh he drains—he substitutes for a huge diffuse inaccessible spot one which is linear and accessible. Since in the Mediterranean basin development of anopheles occupies two or three weeks, alternation at least every 15 days of water distributed for irrigation may be an antilarval measure of value. Prophylaxis can only be applied with success to a disciplined, willing population.

C. L.

DARLING (Samuel T.). **Mosquito Species Control of Malaria.**—*Amer. Jl. Trop. Med.* 1926. May. Vol. 6. No. 3. pp. 167–178. [4 refs.]

"Every malaria problem should first be subjected to field studies, to determine its specific nature and define its limits." It was found that in cultivated sawahs (paddy fields) no *A. aconita* larvae, the locally implicated anopheles, could be found; where they had been neglected, grassed over, with a little water in one corner, this mosquito was present as it was in irrigation ditches. Here was an opportunity for species sanitation by clearing and keeping clean ditches and keeping all sawahs in cultivation. The results were: easier tillage, a crop increased 25 to 50 per cent., a reduction of spleen rate from 71·43 per cent. and an influx of people from neighbouring parts, for which there had been no inducement in the former deplorable health conditions of the population.

C. L.

DEEKS (W. E.). **Problems in Malaria Control.**—*Fourteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1925. pp. 170–186. [3 refs.]

The conditions influencing malarial incidence are put as being rainfall, site, screening, individual or racial immunity, and physical condition. Regarding screening, it is noted that 29 per cent. of unscreened native population and 6·6 per cent. of non-immune foreigners living in screened houses were found infected. It is noted how large a number of the malaria-infected also harboured worms, but controls were not instituted. This question of physical condition is emphasized —"It is our belief that quinine takes care of malaria infections only when the patient is otherwise in good physical conditon," and it is held that if quinine fail some other drug should be tried. For chronic infections the author advises one or two tablets after each meal, each containing, in grains, quinine sulphate 2, reduced iron $\frac{3}{4}$, arsenious acid $\frac{1}{300}$, extract of nux vomica $\frac{1}{4}$. Stovarsol was effective in a chronic relapsing tertian malaria, and unsuccessful in two acute subtertian cases, although this distinction is not perhaps appreciated in the original.

C. L.

IYENGAR (M. O. T.). **The Importance of Animal Prophylaxis in Malaria.** —*Rep. Proc. Fifth Entomological Meeting held at Pusa, 1923.* pp. 203–212. [19 refs.]

After reviewing the suggestion of ROUBAUD regarding animals as screens for man, Iyengar classifies Indian anopheles under four heads. (1) Species essentially wild—*A. gigas, barbirostris, aitkeni* and *lindesayi*; (2) Species preferring animals to man—*A. hyrcanus* (*sinensis*), *fuliginosus, jamesi, maculipalpis* and *maculatus*; (3) Species preferring man to animals—*A. vagus, subpictus, jeyporensis* and *culicifacies*; (4) Species living solely on human blood—*A. minimus, listoni, varuna*, and *stephensi*. Future experiments are outlined.

C. L.

PALESTINE. **Proceedings of the Twelfth Meeting of the Antimalarial Advisory Commission, Jerusalem, 27th May, 1926.** [HERON (G. W.), Director of Health, President.]—21 pp. [MS. received from Dept. of Health, Jerusalem.]

The following are a few of the interesting points contained in these proceedings. The major works are progressing steadily. BRIERCLIFFE notes the recorded deaths from malaria in Palestine for the last six years as follows, 526, 94, 67, 78, 33, 13. More reliable annual figures for Jerusalem are 35, 30, 17, 5, 5, 2, 2. The totals of hospital treatments and of those treated for malaria for the last four years are, 283,156 and 20,297; 270,945 and 13,280; 285,215 and 11,732; 339,795 and 7,249. Spleen rates have fallen over the country from 54·5 in 1918 to 3·1 in 1925, and in Jerusalem in the same period from 44 to 0·8. The Arab population, the largest and economically the most important, is much most heavily affected. Since the war, the economic condition has bettered, so that the whole improvement is not claimed as being due to deliberate antimalarial work.

Dr. SHAPIRO spoke of the killing of hibernating mosquitoes in dwellings and stables in January or February by smoking, when the sluggish insect flew to the single spot of light and was killed by hand or trapped by oiled glass. If the catch was large, the process was repeated. The process, if thorough, was held to delay considerably the first anopheles brood. Similarly, hibernating larvae were sought, preferably on a warm bright day, which tempted them to the surface, and destroyed by petrolization or by removal of their haunts.

Colonel HERON emphasized the local difficulties of effective drainage and the matter of attaining success by constant trial.

C. L.

ARÁOZ ALFARO (Gregorio). Orientacion y estado actual de la lucha antipalúdica. [**Orientation and Present State of Antimalarial Work.**]—*Semana Méd.* 1926. July 15. Vol. 33. No. 28 (1696). pp. 117–126. [9 refs.]

This address was delivered at the third National Congress of Medicine, by the President of the National Department of Hygiene, Argentina, and deals with malaria as it affects that country (that is to say, a tenth of the population or about a million persons) with retardation of progress and wealth, quite apart from some 350 deaths yearly. The period of neglect of public health has happily passed. Preventive quininization, it is noted, has considerably diminished pernicious attacks, cachexia and mortality in Italy and Greece. Screening is unsuitable for most of the houses concerned. A striking example of the value of antilarval work is the conversion of a dead branch of the river Dulce in Santiago del Estero into a fine park, and the disappearance of malaria from a population which had suffered to the extent of 80 per cent. The necessity of parallel legislation in the various States and of collaboration between municipal authorities, owner and neighbours is insisted upon. A national commission consisting of medical men, hygienists, biologists, engineers, sociologists, philanthropists and men of public affairs is urged to maintain orientation and continuity in antimalarial work.

C. L.

GAROFALI (Filiberto). Dieci mesi di lotta antimalarica in Amaseno (Lazio). [**The Malaria Campaign in Amaseno (Latium).**]—*Riv. di Malariologia.* 1926. Mar.–Apr. Vol. 5. No. 2. pp. 157–163. [English summary p. 251.]

"In Amaseno, a town of about 3,000 inhabitants, malaria has been increasing, a fact which the author attributes in great part to deforestation. The same conditions are noted throughout the region. A survey of school children showed: spleen index 90, parasite index 69, average haemoglobin 30-35. The author also attributes to malaria the high mortality from pneumonia (12·6 per cent. in 87 cases). [In U.S.A. the mortality in a series of 6,500 cases was 36 per cent.]

"The anti-malarial campaign consisted almost exclusively of quininization, for lack of other means. In the period of ten months the general malaria index was reduced from 95 to 15·20. Attention was given to the education of school children with regard to malaria."

C. L.

ZIEMANN (H.). **Remarks on Clayton Lane's Criticism of my Monograph on Malaria and Blackwater Fever in the** *Tropical Diseases Bulletin*, **1925. Vol. 22. No. 4. p. 338.**—*Jl. Trop. Med. & Hyg.* 1926. Mar. 15. Vol. 29. No. 6. p. 89.

LANE (Clayton). **Ziemann's Malaria and Blackwater Fever.**—[Correspondence.]—*Ibid.* July 1. No. 13. p. 200.

Professor Ziemann's article consists of nine numbered paragraphs in which he offers objections to statements in Colonel Clayton Lane's review. Clayton Lane replies, in a letter dated April 8th, that in his reconsidered judgement, the review requires no alteration, and asks those interested to undertake the necessary comparisons for themselves; he suggests that Ziemann has imperfectly understood what he (Lane) wrote.

A. G. B.

i. ROMBACH (K. A.). **Malaria tertiana.**—*Nederl. Tijdschr. v. Geneesk.* 1926. May 8. 70th Year. 1st Half. No. 19. p. 1914. [2 refs.]

ii. DE JONG (Jac. J.). Malaria tertiana met lange latentie. [**Long Latent Tertian Malaria.**]—*Ibid.* July 10. 70th Year. 2nd Half. No. 2. p. 163.

iii. KOLLEWIJN (J. R.). Twee tertiana-gevallen met lange latente periode. **Two Tertian Cases with Long Latency.**—*Ibid.* May 22. 70th Year. 1st Half. No. 21. pp. 2084–2085.

iv. GÖBL (A.) [Ein Fall von mit Stibenyl behandelter chinin-resistenter Malaria tropica. **Case of Quinine-Resistant Malaria Tropica treated with Stibenyl.**]—*Gyogyaszat.* 1926. No. 1. [Summarized in *Arch. f. Schiffs- u. Trop.-Hyg.* 1926. June 1. Vol. 30. No. 6. p. 261.]

v. KOUN. Evolution du paludisme dans la ville et les environs de Hué. **Malaria in the Town and Environs of Hué, Annam.**—*Bull. Soc. Path. Exot.* 1926. May 12. Vol. 19. No. 5. pp. 335–337.

vi. PUCA (Annibale). Sindrome cerebellare e psicosi da malaria. [**Cerebellar Syndrome and Psychosis in Malaria.**]—*Riforma Med.* 1926. May 17. Vol. 42. No. 20. pp. 461–463. [14 refs.]

i. A woman showed "Plasmodium malariae" in blood investigated on account of tertian fever in Utrecht. She had last been in Edam about three months earlier, in which place she probably became infected. It is noted that some unknown factor determines the length of latency.

ii. A youth of 17 had lived at Lederdorp and Katwijk, neither of which is held to be a possible place of infection. Tertian malaria, microscopically established, showed itself on 26th May, 1926. It is believed that infection must have been acquired at Wormerveer (Noord-Holland) in August, 1925, and remained latent for about nine months.

iii. Two microscopically established cases are reported which first showed malaria 9 and 12 months after coming to Helmond. These are set down as the latent periods on the ground that there is no malaria in Helmond, so that [so the circle runs] regarding every case which shows malaria in Helmond it may with certainty be said that it was acquired elsewhere.

iv. The abstract merely states that a man of 37, infected in Greece, had his first rigor in Budapest. He was treated for about four months with quinine and salvarsan, consuming 78 gm. of quinine. He then had in four months 1·4 gm. of stibenyl in doses of 0·1–0·3 gm. Crescents disappeared 13 days after the last injection.

v. Referring to KÉRANDEL (Soc. Path. Exot. meeting, 9.12.25) Koun describes the condition of Hué in 1910 and 1911 when 1,176 cases of malaria were treated. Of 200 specially examined, 175 came from Hué itself and these infections were: quartan 8, subtertian 20, benign tertian 147, while the parasite index in children varied between 15·6 and 44. At the present time the splenic index is infinitesimal.

vi. A single case of infection with *P. vivax* which recovered is described in great detail. It is concluded that cerebellar insufficiency is the most frequent central nervous symptom in malaria, that prognosis is nearly always good, that neosalvarsan in small doses is a provocative, and that quinine with arsenobenzol is the best and safest treatment.

C. L.

i. NOSSINE (V. K.). Sur un cas d'infection paludique congénitale. [**Case of Congenital Malaria.**]—*Russian Jl. Trop. Med.* 1926. No. 5. French summary p. 79. [In Russian.]

ii. SCHWARTZMANN (A. M.). L'incidence du paludisme chez la population de la ville de Kazan d'après les données de l'hiver 1925–26. [**Incidence of Malaria in the Town of Kazan, 1925-6.**]—*Ibid.* French summary p. 79. [In Russian.]

iii. MIRZOIAN (A. A.). **The Malaria in the Jdjevan Districts and the Measures taken against it and the Discovery of the *Anopheles superpictus* Grassi in it.**—*Ibid.* No. 4. English summary p. 76. [In Russian.]

iv. BISBINI (Bartolomeo). Osservazioni cliniche epidemiologiche su di un caso di malaria autoctona nella città di Modena. [**Case of Autochthonous Malaria in Modena City.**]—*Gazz. d. Osped. e d. Clin.* 1926. Feb. 21. Vol. 47. No. 8. pp. 171–174. With 1 chart. [11 refs.]

v. MALAUSSÈNE. Le paludisme à Gorée. [**Malaria in Gorée.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 507–511.

vi. AUDAY (I.) & ARANA (Enrique L.). Un caso de asma palúdica. [**Case of Malarial Asthma.**]—*Semana Méd.* 1926. June 3. Vol. 33. No. 22 (1690). pp. 1214–1215.

vii. v. SCHNIZER. Dienstbeschädigung für Psychose nach Malaria angenommen. [**Service Casualties due to Psychosis following Malaria.**]—*Med. Klin.* 1926. July 2. Vol. 22. No. 27 (1125). pp. 1045–1046.

viii. BANNERJEE (Kartick Chandra). **An Interesting Case of Malaria.**—*Indian Med. Gaz.* 1926. June. Vol. 61. No. 6. pp. 285–286.

ix. CHATTERJEE (S.). **Quinine Urticaria, and Absorption of Quinine in Malaria.**—*Indian Med. Rec.* 1926. June. Vol. 46. No. 6. p. 171.

i. *P. vivax* was detected 23 days after delivery in mother and child in March in Moscow, at a season said to be without anopheles.

ii. Fever cases in Kazan have fallen from 66 to 39 per cent., being highest in quarters near anopheline breeding-places. A spring predominance has given place to a summer one caused by *P. falciparum*. In 1926 relapses were greatest in autumn.

iii. Sanitary measures have been continued in this mountainous part of Armenia for three years. Of 889 mosquitoes 441 were *A. maculipennis*, 436 *A. superpictus*, and 12 *Culex* sp. In 137 of 194 stables examined between November and February, 1925, "malarial" mosquitoes were found.

iv. The author minutely describes a case of infection by "the parasite of malaria" showing itself as rings seen in every field. No case has been reported in the city of Modena for many years. Possible means of infection are discussed.

v. The Island of Gorée, off Senegal, has been shown to be indigenously infected with malaria. This has been confirmed by the Pasteur Institute, Dakar.

vi. No parasites were found and the percentage of large mononuclear leucocytes is placed at 0. Quinine gave relief.

vii. Malaria was followed by the appearance of epileptic convulsions with great nervousness, and must be borne in mind among the causes which, through psychosis, prevent efficient military service.

viii. A case of cerebral malaria with unconsciousness and repeated tonic convulsions recovering rapidly under intravenous quinine administration. It is recorded without comment that the parasite present was *P. vivax*.

ix. An abstract of literature already abstracted in this *Bulletin*.

C. L.

Ascoli (Vittorio). La malaria cronica.—*Riv. di Malariologia.* 1926. Mar.-Apr. Vol. 5. No. 2. pp. 164–181. [English summary p. 252.]

Bewley (Geoffrey). The Treatment of General Paralysis of the Insane by Malaria, with Reports of Two Cases.—*Irish Jl. Med. Sci.* 1926. Aug. 6th Ser. No. 8. pp. 358–364. [12 refs.]

Bunker (Henry A.). Die Bedeutung der Gewichtszunahme in der Malaria-Behandlung der progressiven Paralyse.—*Klin. Woch.* 1926. July 16. Vol. 5. No. 29. pp. 1319–1320.

Chatterjee (S.). Quinine Urticaria, and Absorption of Quinine in Malaria.—*Indian Med. Rec.* 1926. June. Vol. 46. No. 6. p. 171.

Hesse (E.). Die Behandlung der Tabes mit Impfmalaria.—*Med. Klin.* 1926. June 11. Vol. 22. No. 24 (1122). pp. 920–921. [4 refs.]

Kerim (Fahreddin). Die Paralyse und die prophylaktische Rolle der Malaria bei syphilitischen Erkrankungen des Nervensystems in der Türkei.—*Wien. Klin. Woch.* 1926. Aug. 5. Vol. 39. No. 32. pp. 915–918. [13 refs.]

Ljahowetsky (A.). To the Question on the Treatment of Malaria.—*Russian Jl. Trop. Med.* 1926. No. 2. English summary p. 56. [In Russian.]

Malagueta (I.). Therapeutica do impaludismo.—*Arch. Brasileiros de Med.* 1926. May. Vol. 16. No. 5. pp. 195–209. [19 refs.]

Nicole (J. Ernest) & Steel (John P.). Acquired Immunity to Malarial Inoculation.—*Jl. Mental Science.* 1926. Jan. Vol. 72. No. 296. pp. 66–69.

Rudolf (G. de M.). Some Aspects of Therapeutic Malaria.—*Proc. Roy. Soc. Med.* (Sect. Trop. Dis. & Parasit.). 1926. July. Vol. 19. No. 9. pp. 27–39. With 20 charts. [14 refs.]

LEPROSY.

ALBERT. La lèpre dans les colonies françaises, sa prophylaxie et son traitement. **Leprosy in the French Colonies, its Prophylaxis and Treatment.**—*Bull. Office Internat. d'Hyg. Publique.* 1926. May. Vol. 18. No. 5. pp. 521–543. [2 refs.]

As the result of the Strasbourg Leprosy Conference an inquiry was made in all the French colonies regarding the incidence of leprosy. Treatment at dispensaries and domiciliary care, as well as separation of the children of lepers from their parents within 48 hours of birth were recommended, and the reports subsequently received from the various colonies are dealt with in this important communication. The incidence of the disease is summarized in the following table :—

Indo-China	30,000	Estimate,	5,454	segregated in villages
French Oceana ...	161		130	segregated in colonies
New-Caledonia ...	1,168			Partial village segregation
Martinique	50			Home and island isolation
French Guiana ...	550	Approximately.		Segregation of indigents
French West Africa	15,000	Estimate.		Partial village segregation
Togo	2,340	Estimate.		Partial village segregation
Camerouns	2,500	Estimate.		Partial village segregation
Madagascar ...	6,000	Estimate.	2,306	segregated
Réunion	114	Census.	48	segregated
India	600	Estimate.	53	segregated
TOTAL ...	58,483			

Most of the information regarding prophylactic measures has been recorded in reviews of recent papers, so only the following points need be noted here. Efforts have been made to separate the children born to leper parents within 48 hours of birth, and this has been done to a considerable extent in Madagascar with the help of crèches and the employment of healthy foster mothers, and to some extent in other colonies by getting healthy relatives to take charge of the infants, but artificial feeding in the tropics among backward people usually results in the death of the children. The amount of segregation in the different colonies is indicated in the table : it has been found practicable only to a small extent mainly on account of its cost, rigid compulsion also leading to hiding of cases. Free treatment at dispensaries in place of isolation was tried in Indo-China and in India, but the results are reported to be very unsatisfactory owing to the patients disappearing in spite of threats to re-intern them.

Treatment.—Very brief remarks on treatment show somewhat variable results, which are summarized in the statement that the cures are so far more apparent than real, and that chaulmoogra preparations have not yet produced anything comparable to the therapeutic miracle of arsenobenzol in syphilis. In Indo-China improvement of an inconstant nature was noted ; in Martinique improvement in 12 out of 20 cases treated ; in French Guiana " Dr. Henry à obtenu d'excellents resultants avec le gynocardate de soude," and with chaulmoogra ethyl esters improvement has been constant ; in Togo the last preparation and arsenic have given encouraging results with improvement in 200 cases treated with chaulmoogra and also in 85 cases given atoxyl ; in the Camerouns chaulmoogra and arsenical preparations have given good results, but they do not allow of indisputable cures being claimed ;

in Madagascar kermes mineral and eparseno-emetic gave no appreciable results. Ethyl ester chaulmoogrates have produced some improvement, but the trials are too recent to allow of a final opinion; in Réunion chaulmoogra preparations gave definite improvement in the few patients submitting to the treatment; and in India gynocardate of soda has been mainly used by subcutaneous injection twice a week and has given rapid improvement, with disappearance of the macules and return of sensibility, good results which favoured the success of the propaganda against the disease, but eparseno gave bad results and was given up. In none of the notes was the stage or duration of the cases mentioned, but presumably they were mostly fairly advanced ones, as there is no mention of any early cases being treated, so the above results may be considered promising, especially with gynocardate of soda, and as compared with those obtained only a decade ago.

L. Rogers.

DENNEY (O. E.) **The Leprosy Problem in the United States.**—*Public Health Rep.* 1926. May 14. Vol. 41. No. 20. pp. 923–929. With 11 figs. on 4 plates. [2 refs.]

The present number of lepers in the United States is placed at a conservative estimate at 1,200, mostly in the Southern Gulf Coast States, and since sufficient accommodation, namely, for 425 patients, was provided at the Carville National Leprosarium in 1924 all known lepers have been sent there, where they have every comfort and attendance and are mostly well satisfied. The institution was described not long ago in this *Bulletin*, and is illustrated in the paper. Compulsory segregation is considered essential for stamping out leprosy, although unfortunately few countries but the United States can afford the high cost of the measure.

L. R.

MILLARD (R. J.). **Leper Lazaret. Thirty-Fourth Report on Leprosy in New South Wales, for the year ended 31st December, 1924.**—*Rep. of Director-General of Pub. Health New South Wales for Year 1924.* pp. 140–141.

This is the usual brief statistical report showing two admissions, two deaths and one discharged in good health with nerve thickening only and some cyanosis of hands and face, but negative bacteriologically; 16 remained at the end of the year, the cost of the institution being £3,096 19s. 3d., or £208 16s. per patient per annum calculated on the average number resident, over half of which went in salaries.

L. R.

COCHRANE (Robert G.). **The Leprosy Campaign.** [Correspondence.] —*Lancet.* 1926. July 10. pp. 95–96. [5 refs.]

The writer reports his experience during a 40,000 mile tour for the Mission to Lepers to investigate the present situation in the light of the new treatment, including some months at the largest leper institution in India, and visits to Burma, Siam, Borneo and the Philippines. He lays stress on the importance of hygiene, exercise and diet in the treatment, as advised by MUIR. In India the most successful treatment

is by hydnocarpus oil or its ester mixed with creosote twice a week by infiltration under the skin lesions as advocated by the Calcutta School of Tropical Medicine, from 0·5 up to 13 cc. being the dose, and he concludes that by these means "in treating leprosy satisfactory results will accrue in the really early cases."

L. R.

NEFF (E. A.). **Leprosy in a Fourteen Months Old Child.**—*Jl. Trop. Med. & Hyg.* 1926. May 15. Vol. 29. No. 10. pp. 146–147.

In view of the comparative rarity of leprosy in children under five years this case is of interest as the child was born to an active advanced nodular leper, and owing to her delicate state of health was allowed to be nursed by her mother. She was about to be sent to her healthy father when a papulo-nodule was noticed in the centre of her left cheek, which must have been present at least three months in a less typical form, and numerous acid-fast bacilli were found in it; they were not found in the nasal mucus, in spite of several examinations, until four months later, when other nodules appeared on her face. Treatment by moogrol injected weekly checked the progress; the original nodule was absorbed, leaving a scar the size of a shilling, but the small nodules left very small scars. The case was bacteriologically negative after seven months and had remained so for several months at the time of reporting. A good example of successful treatment of an early case.

L. R.

DORE (S. E.). **Nodular Leprosy previously shown.**—*Proc. Roy. Soc. Med.* (Sect. of Dermat.) 1926. June. Vol. 19. No. 8. pp. 52–55. With 4 figs. [1 ref.]

This is a report on a case with typical nodular leprosy shown in October 1924 in a boy who was first seen eighteen months after the appearance of the disease (see this *Bulletin*, Vol. 22, p. 216). He was treated with injections of E.C.C.O. and moogrol and sodium gynocardate pills, but the dose of the first could not be increased as it made him ill, and he could not take chaulmoogra oil; sodium gynocardate intravenously (the most active form of treatment) could not be tried as his mother would not allow him to go to hospital. An autovaccine made from one of his nodules was also tried, but all failed and he has got steadily worse; a good example of the failure of the less active preparations in a case not treated early.

L. R.

HUDELO, MOUZON & DUHAMEL. Sur un cas de lèpre nerveuse avec tremblement et symptômes de la série spasmodique (lèpre a forme mixte d'emblée). [**Case of Nerve Leprosy with Tremor and Spasms.**] —*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1926. June 17. Year 42. 3rd Ser. Vol. 50. No. 21. pp. 971–975.

This case showed the very rare symptoms of tremor of the extremities and exaggerated reflexes and clonus, and was discussed by M. JEANSELME, who had not seen a similar case.

L. R.

ESCARTEFIGUE (Jean). Fréquence dans les troupes noires des cas de lèpre sans bacilles décelables. (A propos des cas observés à l'Hôpital Sainte-Anne de Toulon.) [**Frequency in Black Troops of Cases of Leprosy without Discoverable Bacilli.**]—*Jl. Méd. de Bordeaux.* 1926. May 10. Vol. 103. No. 9. pp. 367–376.

Among the black troops recruited in the African and West Indian colonies of France, with about 48 million people, cases of leprosy are not infrequently found, as when the men are collected in remote villages it is not possible to submit them on the spot to expert medical examination. At least 1 per cent. are subsequently found to be lepers, and many have been met with in the Toulon naval hospital. The diagnosis of leprosy on the usual lines is discussed at length, and the interesting point is brought out that among the comparatively early cases met with in the recruits, 9 out of 14 cases carefully examined in the laboratory did not show any lepra bacilli in their early skin lesions, although the clinical signs were quite distinct. In the absence of any diagnostic value of the Wassermann or other serum test, these must be relied on in making the diagnosis.

L. R.

PINEDA (Eloy V.) & ROXAS-PINEDA (Elisa). **Studies on the Serology of Leprosy. I. The Wassermann Reaction in Leprosy.**—*Philippine Jl. Sci.* 1926. May. Vol. 30. No. 1. pp. 39–57. [21 refs.]

This is an important paper as it deals with a large number of cases and the technique was good. It confirms the recent work of KOLMER and DENNY, who obtained uniformly negative results in non-syphilitic leprosy cases with KOLMER's new standardized technique, which is admitted to be superior in the diagnosis of syphilis. The Philippine workers now report on 500 leper sera examined by Kolmer's method, about 150 of which were also tested by an ordinary method using both plain and cholesterinized antigens. The total cases included 66 untreated and 59 cases negative bacteriologically after treatment, as well as 82 cases tested during lepra reactions. Of the 500 cases 85, or 17 per cent., gave reactions positive in some degree, the doubtful plus-minus reactions being included, and of these 58 were in a group of 67 under suspicion of yaws (42 cases) or syphilis (25 cases). The remaining 27 gave a history of neither, and it is very interesting to note that 11 of these 27 were among those showing lepra reactions when tested, 8 of them giving strong Wassermann reactions, although only 1 of the remaining 16 positive cases showed a strong reaction, and the remaining 15 with weak reactions were probably due to serum changes of leprosy. They therefore conclude that with such refined technique as that of KOLMER the Wassermann reaction is negative in uncomplicated cases of leprosy in the ordinary non-reacting phase, so that when strongly positive it indicates some such complication as yaws or syphilis.

L. R.

BALFI (E.). La reazione di Wassermann dei parenti e famigliari dei lebbrosi (nota preventiva). [**The Wassermann in the Relatives and Associates of Lepers.**]—*Giorn. Ital. di Dermat. e Sifil.* 1926. Apr. Year 61. Vol. 67. No. 2. pp. 614–617. [2 refs.]

The author examined the sera of 43 persons, using leproma extract as antigen, and found four positive: a girl of 16 years, without symptoms,

the daughter of a leper of 30 years' duration; the mother of a leprous male, ill with the disease in nodular form for 3 years; two sisters of the last-mentioned. This investigation was completed before the author had seen the work of MUIR, LLOYD and MITRA on the Wassermann reaction in 104 children of leprous parents.

H. Harold Scott.

WADE (H. W.). **Studies on the Serology of Leprosy. II. Nitric Acid Precipitation (Bruck, modified).**—*Philippine Jl. Sci.* 1926. May. Vol. 30. No. 1. pp. 59–67. [15 refs.]

In view of negative Wassermann reactions in uncomplicated leprosy with improved technique, it is important to investigate the serum changes in this disease to try to find a diagnostic method, so Bruck's reaction, consisting of a rough determination of excessive globulin precipitation by nitric acid in dilute serum, has been tried in 100 leprosy cases with 16 controls. 93 leper's sera gave strong to moderate reactions, and none were negative, but strong reactions were only met with in 7 per cent. of treated to 44 per cent. in untreated ones, and a similar low proportion was found in 10 bacteriologically negative cases. As only 3 of the 16 healthy non-leper controls gave negative reactions, mostly slight ones, the method is of no diagnostic value, although the number of strong reactions in lepers points to some alterations in their sera requiring further investigation.

L. R.

SCHOBL (Otto) & RAMIREZ (Jose). **Serological Analysis of Leper's Sera.**—*Philippine Jl. Sci.* 1926. Mar. Vol. 29. No. 3. pp. 305–326. [4 refs.]

In view of the contradictory statements in the serological literature of leprosy, the writers have investigated certain aspects of the question in 92 lepers. They have found no distinct quantitative differences in the content of natural haemolysins and complement in the sera of lepers and of healthy controls, and the keeping properties, as shown by the rate of decrease of complement, were also the same.

L. R.

RAËVSKY (A.) & BRAOUL (J.). À la sérologie de la lèpre. [**Serology of Leprosy.**]—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. French summary p. 231. [In Russian pp. 139–142. 9 refs.]

All acid-fast bacilli give serum reactions in common, so the authors have examined the sera of 93 lepers for reactions with the antibodies of tubercle bacilli. In 44 active nodular cases they found strongly positive reactions in 10, positive in 17, weakly so in 12 and nil in 5 cases, and in inactive and latent cases and early nodular cases they got 2 strong, 7 positive and 20 negative reactions, while in nerve cases only two were weakly positive, and in 9 cases practically cured only 2 gave feeble reactions. The reaction was negative at the commencement of the disease, after cure and in very grave complicated cases, so the sedimentation reaction of Darangi has some value in estimatng the activity or otherwise of the disease.

L. R.

PARAS (Ernesto M.). **Blood-Chemistry Studies in Leprosy. I. Non-protein Nitrogenous Substances, Sugar, and Chloride.** *Philippine Jl. Sci.* 1926. June. Vol. 30. No. 2. pp. 219–234. [10 refs.]

Little work has yet been done on the chemistry of the blood in leprosy, and this paper deals with the subject in 100 lepers and 17 healthy controls, with the result of coming to the following conclusions :–

"1. The methods and results of the chemical analysis of blood in 100 lepers and in 17 presumably normal individuals are reported. The lepers were classified in the following groups : those without complications, those with miscellaneous complications, those with tuberculosis, those with lepra reactions, and those with nephritis.

"2. The blood values taken as normal for the various constituents were as follows : Nonprotein nitrogen, 23 to 33 milligrams ; urea nitrogen, 7 to 19 milligrams ; uric acid, 2·6 to 4·4 milligrams ; preformed creatinine, 1 to 1·5 milligrams ; sugar, 80 to 160 milligrams ; chlorides, calculated as sodium chloride, 0·42 to 0·49 per cent. All figures were calculated as per 100 cubic centimeters of whole blood.

"3. The results obtained from normal individuals are compared with those obtained by other investigational workers.

"4. A study of the results collected brings out the following facts :

"(*a*) No regular correspondence can be traced between the blood findings and the duration, extent, or type of leprosy, or the antileprosy treatment.

"(*b*) The average values for nonprotein nitrogen, uric acid, creatinine, and sugar for all of the leper groups were somewhat high, although many individual cases showed normal values.

"(*c*) The average values for nonprotein nitrogen and urea nitrogen are markedly high, not only in the group of lepers with nephritis, but also in the group with lepra reactions.

"(*d*) The group averages for urea nitrogen are normal except as above stated, and those for chloride are normal throughout."

L. R.

CONCEPCION (Isabelo) & SALCEDO, Jr., (Juan). **The Calcium Content of Blood in Leprosy.** *Jl. Philippine Islands Med. Assoc.* 1926. May. Vol. 6. No. 5. pp. 154–157. [9 refs.]

As READ has found that injections of ethyl hydnocarpate in dogs altered the amount of calcium in the blood, the writers have estimated the calcium in the whole blood of lepers by Halverson and Bergeim's method and found it to be within the normal limits in all cases except paroled and suspect cases. The average amount was much less in those of under a year's duration than in those of longer standing, but no marked difference was found in the two main types of leprosy. The slight increase in the calcium content in cases that have recovered and been paroled was not due to the ethyl ester injections.

L. R.

ANTUNES (Altino). Pesquisa dos bacillos de Hansen nas manchas. **Search for Lepra Bacilli in Maculae.** *Brazil-Medico.* 1926. May 29. Year 40. Vol. 1. No. 22. pp. 285–286.

To obtain material, the author makes a linear incision at the edge of a macula, presses the lips of the wound to prevent excess of blood-flow, and then scrapes off a little of the tissue in the depth of the cutis,

smears it on a slide, and stains it by the Ziehl-Neelsen method, differentiating with 1 per cent. acid-alcohol. He found the bacilli in 21 out of 39 cases and suspects examined, but states quite candidly that in 8 cases of obvious disease, he failed to find them in this way.

H. Harold Scott.

BARGEHR (P.). Zur Epidemiologie der Lepra. [**Epidemiology of Leprosy.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1926. Vol. 66. No. 2. pp. 188–194. [In German.]

Bargehr's experience as a medical officer in charge of the Leprosy Asylum Plantoengan (Java) leads him to certain conclusions, which he summarizes as follows :

(1) The spread of leprosy is not intimately connected with bad social circumstances.

(2) The disposition to leprosy is not a general one.

(3) It can be raised by an hereditary factor.

(4) It is subject to a marked endemic influence of unknown origin, which may decrease or increase in the course of time.

W. J. Bais.

POPOFF (P. P.). Sur le rôle des insectes dans la propagation de la lèpre. [**The Rôle of Insects in the Spread of Leprosy.**]—*Oeuvres de l'Inst. Tropicale de l'Armenie.* 1926. Vol. 1. French summary pp. 7–8. [In Russian.]

The writer has studied lepers in their homes in Armenia, and in the Erivan hospital, and examined 158 insects found in the leper's hall. One *Cimex lectularius* only contained acid-fast bacilli, but he thinks insects may play a part in the propagation of the disease.

L. R.

GENEVRAY (J.). Essais de traitement de la lèpre par les éthyl-éthers de l'huile de chaulmoogra et l'éparséno. [**Treatment of Leprosy by Ethyl Esters of Chaulmoogra Oil and Eparseno.**]—*Bull. Soc. Path. Exot.* 1926. June 9. Vol. 19. No. 6. pp. 441–462.

This is a report on a careful trial of treatments of leprosy on a large scale over a period of three years in the Leprosarium of New Caledonia with 130 lepers, of whom 115 are Europeans. The first part deals with the use of chaulmoogra ethyl esters, prepared by Poulenc under the name of "Hyrganol", which causes little pain on injection. The cases were quite unselected, but mostly well advanced in the disease and a number of many years duration. 70 patients were treated by this preparation; at first only 10 volunteered for it, but the others came forward after seeing improvement in the first few. No serious reactions were met with, and only 7 easily cured abscesses in over 5,000 injections. Improvement was noted firstly in the disappearance of macules, then in the decrease or disappearance of nodules, regrowth of hair if not lost for very long, rapid diminution of, and cessation of epistaxis, and improvement in sensation with lessening or disappearance of thickening of the nerves and healing of ulcers; the general health also improved distinctly, and in some cases clincal cure, that is disappearance of all symptoms and of lepra bacilli resulted. The action of the drug on the bacilli was investigated in nine cases by counting the

proportions of rods and of broken down or granular organisms in removed portions of tissue before and after treatment, and in all of them great reduction in the percentage of well staining rods or even their complete disappearance was noted, at the same time that clinical improvement took place, so they agree with earlier workers in considering that the lepra bacilli become destroyed in the tissues. He summarizes the results in the 70 cases as follows :—

Cured (clinically)	6	8·75%	40%	—
Nearly cured	12	17·14%		51%
Much improved	10	14·28%		
Slightly improved	8	11·42%		
Stationary	34	48·57%		

Young persons not long affected did best, but cases of 4 to 12 years' duration also did well sometimes. He points out that it is not surprising that very advanced nodular, nervous or mixed cases, some of 30 years' duration, and with a mean of 10 to 15 years, have shown no appreciable results, but on comparing such cases with untreated ones it was noted that the disease had been arrested by the drug. He concludes that, although the treatment cannot be considered a specific cure for leprosy and long-sustained severe cases showed no improvement, in moderately advanced cases the improvement has been partial, and in recent and milder cases, especially in the young, the clinical and bacteriological improvement has been quite clear and sometimes progressed to apparent cure ; the treatment thus constitutes a real therapeutic progress by its action on both the lesions and the bacilli, and also a prophylactic weapon of the first importance.

A trial of eparseno (amino-arseno-phenol) was made in 31 cases, using the moderate doses recommended by Gougerot. These were painful and caused induration, increased the pigmentation and sometimes caused severe reactions, and in two alcoholic patients fatal results were considered to have resulted from the injections, so that the treatment requires very close medical supervision, although many stood it well. A table of the results shows great improvement in one only, one slightly improved, 25 unchanged, and 3 worse, 1 of whom died a year later and 2 died from the treatment. He concludes that the drug has no specific action in leprosy, and that it has no curative value comparable with that of the ethyl-esters of chaulmoogra oil.

L. R.

Balbi (E.). Sulla cura della lebbra con i chaulmoograti sodici. **Treatment of Leprosy by Sodium Gynocardate.** *Giorn. Ital. di Dermat. e Sifil.* 1926. Apr. Year 61. Vol. 67. pp. 623–629. [14 refs.]

Five cases of leprosy are recorded in which, after various forms of treatment had been adopted in vain, injections of sodium gynocardate were given. The first was a woman of 52 years, with nodular leprosy of six years duration. Treatment was continued for six months, and 12 gm. were used in all (8 intravenously, 4 subcutaneously) and 20 cc of sodium morrhuate. There was marked improvement, but after 37 injections intolerance occurred of such a degree that treatment had to be suspended. The second patient was a man of 44 years, who had suffered for 16 years from mixed leprosy. He had 17 gm. of the drug (15 intravenously and 2 subcutaneously) and 25 cc. of sodium morrhuate in the course of eight months. Improvement was striking, some

nodules disappeared, the remainder diminished in size, and the ulcers healed. The other three patients were treated for three months only, and the improvement, though it occurred, was considerably less than in either of the other two. The drug had no effect on the Wassermann reaction, which was positive in all five patients.

H. Harold Scott.

WILSON (R. M.). **Treatment of Leprosy.** —*Southern Med. Jl.* 1926. Aug. Vol. 19. No. 8. pp. 603–604.

The writer in Korea, who has had several years experience of the improved leprosy treatment on a large scale, reports further favourable results, for after eliminating 24 deaths and 15 with tuberculous complications, 90 per cent. of all cases showed improvement. 300 cases had weekly injections of 4 to 8 cc. of chaulmoogra oil (hypocardnia) with 1 per cent. of camphor, according to MUIR's plan, which prevents pain; and another 200 had injections for two or three years and then took the oil by the mouth; these remained in good health and can be discharged. Of 75 cases discharged about 18 months ago, only about five had shown a return of the condition, and these few recurrences were probably due to lack of good food and proper attention. Further, at the Fusan colony under his direction, 375 cases are having the ethyl-esters; "and 62 per cent. of these report improvement and 52 per cent. report that they are leading an active life and able to work. In our place at Kwanju, 72 per cent. have the disease so arrested that they can lead an active life and take part in the farm and other work about the place". Formerly the ethyl-esters caused so much pain that the lepers then treated by it have refused injections since, but Dr. READ, of Pekin, now reports having made a preparation which is not painful, and it is being tried in a few cases with one per cent. camphor. Work is good for the patients, and no one but lepers are now employed about the colony, the lepers doing everything for themselves, including carpentry, which helps to prevent stiff joints and atrophy of muscles, massage often helping.

L. R.

PARRA (Ricardo J.). Tratamientos de la lepra en Agua de Dios. **The Treatment of Leprosy in Agua de Dios.** —*Repert. de Med. y Cirug.* Bogota. 1926. Feb. Vol. 17. No. 5. (197). pp. 260–266; and in *Gac. Med. de Caracas.* 1926. May 31. Vol. 33. No. 10. pp. 156–158.

All the forms of treatment recommended for this disease have been tried from time to time in Agua de Dios, namely atoxyl, chaulmoogra oil and its ethyl esters, arsenobenzol, nastin, gynocardate of sodium, leprolisina Dávila, eparseno, and antimonial compounds.

Later, four patients were treated with E.C.C.O. (Ethyl esters of the fatty acids of *Hydnocarpus Wightiana*, 1 cc.; Camphor 1 gm.; Creosote 1 cc.; Olive Oil 2·5 cc.). Details of these are given, and the results may be summed up by saying that the local effects were less marked than with other preparations, but the results generally were no better than with the pure esters or the oil of chaulmoogra itself, whether taken by mouth or by injection.

Lastly, sodium morrhuate has been employed by subcutaneous injection of a 3 per cent. strength in two cases. One patient improved

clinically, but up to a certain point only; the other could not tolerate doses higher than 2 cc., and the condition remained stationary. The former received, in all, 69 injections, and a total of 175·5 cc.; the second had 47 injections, and 93 cc. altogether.

H. Harold Scott.

DE PARRELIRAS HORTA. Traitement de la lèpre et de quelques dermatoses par l'huile de *Carpotroche braziliensis*. **Treatment of Leprosy by the Oil of** *C. braziliensis*.]—*Bull. Soc. Française de Dermat. et de Syph.* 1926. Apr. No. 4. pp. 365–367.

Carpotroche braziliensis is one of the Flacourtiacee, the natural order which includes Hydnocarpus, so Professor DEL VECCHIO of Rio de Janeiro has prepared an ethyl ester of the oil extracted from its seed which the author since 1921 has used either pure or with chaulmoogra oil in the treatment of leprosy. He has gained the impression that it has a very favourable action in the disease; it is only slightly irritant to the tissues, and is well tolerated mixed with oil of camphor or oil of chaulmoogra up to 5 cc. doses intramuscularly. Two cases have shown improvement, which he admits is not sufficient to allow of a decided opinion being given on its value. He also tried in two cases, without any benefit, a combination of the oil with copper. The oil is also an active parasiticide when applied to the skin in sycosis, etc.

L. R.

SEABRA (Paulo). A chaulmoogra brasileira. **A Brazilian Chaulmoogra.**]—*Brazil-Medico.* 1926. May 15. Year 40. Vol. 1. No. 20. pp. 268–270. [1 ref.]

The author gives a general account of a plant, *Carpotroche brasiliensis*, which, from its constituent oil and its action, is also known as Brazilian Chaulmoogra. The oil has a greater dextro-rotatory power than that of *Taraktogenus kurzii*, 53·4°, as against 48°. A copper salt of the fatty acids was obtained, but injection of it caused great pain and at times local necrosis. As a result of further experiments a colloidal product was prepared which was named Karpotran, a "physiohydrosol of cupric carpotrochate". Improvement of symptoms of leprosy follows its use without any unfavourable consequences, but whether it is really superior to chaulmoogra in the long run has yet to be established.

H. Harold Scott.

MUIR (E.). **External Medication in Leprosy.**—*Indian Med. Gaz.* 1926. May. Vol. 61. No. 5. pp. 215–219. With 9 text figs.

This paper deals with the applications of caustics and use of surgical measures in leprosy. The best method of producing counter-irritation is by applying trichloracetic acid in a strength of 1 to 1 of water over the centre of large thick nodules, 1 in 3 for general use on skin lesions and 1 in 5 for lesions on the face. The solution is painted over the lesions with cotton wool on a glass rod or piece of wood, such as a match, until a white appearance is left on drying, and repeated every 10th day, one third of the lesions being dealt with at a sitting when the injections are being given twice a week. Illustrations of the effects are given. The surgical measures advised are the removal of

early nodules with local anaethesia when only one or two are present, trimming of the auricle of the ear when much thickened, heat by the application of a curved clamp and cutting off the projecting part and covering with dry cotton wool, the method and results being illustrated; and in the case of greatly thickened nerves or abscesses in them an incision of three or four inches will enable the nerve and its sheath to be freed from surrounding tissue or any abscess opened, which relieves severe pain at once, reduces the size of the nerve and restores some of its function.

L. R.

MUIR (E.). **Some Fallacies connected with the Testing of Drugs for their Efficacy in the Treatment of Leprosy.**—*Indian Jl. Med. Res.* 1926. July. Vol. 14. No. 1. pp. 125–128.

The writer draws attention to the following fallacies in leprosy treatment: (1) Patients not rarely come in an acute reactionary phase with the appearance of new lesions, which tend naturally to subside to a considerable extent without treatment, so this occurrence should not be attributed to any drug in use at the time. (2) The not infrequent presence of syphilis in leprosy patients in India leads to improvement after arsenical preparations due to their action in removing an important predisposing cause of leprosy being mistaken for an action on the leprosy itself. (3) The good local effects of counter-irritation over leprous lesions leads to innumerable drugs acting in this way being thought to have a specific action on the general disease. (4) Due to not distinguishing between permanent and temporary lesions, the failure to remove the former being allowed to discredit a drug, although "it is as absurd to expect many of these permanent lesions to disappear under treatment as it would be to expect the disappearance of pock-marks in those who have suffered many years ago from small-pox." "Patches which are bacteriologically negative, have no raised or spreading margin, and show no increase in size over a period of two years may be considered permanent."

L. R.

DEVOTO (A.). Tentativi di cura della lebbra con vaccini preparati coi noduli leprosi (nota preventiva). [**The Cure of Leprosy by Means of Vaccines made from Leprous Nodules.**]—*Giorn. Ital. di Dermat. e Sifil.* 1926. Apr. Year 61. Vol. 67. No. 2. pp. 618–623.

The author reviews the previous records of attempts to treat leprosy by vaccines on the part of ROST, WILLIAMS, ZIRONI, WINKELRIED, and others, showing how contradictory the results have been. He then details three cases in which he used PORCELLI's method of injecting an autovaccine obtained by triturating nodules and treating them with antiformin, which dissolves away much of the tissue, sets free the bacilli, and has an detoxicating action on the extract. The preparation is finally standardized to contain 500 million bacilli per cc. and is sterilized by heating to 60° C. for 30 minutes and the addition of 0·5 per cent. phenol.

The three patients were men of 51, 29, and 28 years of age respectively, with mixed leprosy of many years' duration, which had resisted all previous forms of treatment. Injections increasing from 1 to 4 cc. were given on alternate days. The first had 7 injections, and the

symptoms rapidly ameliorated; repeated examinations showed that the bacilli had almost disappeared. The second had 20 injections increasing to 5 cc. for the last. The nodules disappeared and bacilli were no longer discoverable. The third was given 6 injections. There was no obvious change in the appearance of the lesions, but the bacilli, which had been very numerous in the nasal mucus, rapidly and progressively diminished in number.

H. Harold Scott.

ALQUIER (A.) & CHALON (G.). Un cas de lèpre d'origine soudanaise observé à El Goléa (Oasis sahariennes).—*Arch. Inst. Pasteur d'Algérie.* 1925. Sept. Vol. 3. No. 3. pp. 293–297. With 1 plate and 2 text figs. [1 ref.]

BOURNE (C. R.). Leprosy in Montreal. Report of a Case.—*Canadian Med. Assoc. Jl.* 1926. Apr. Vol. 16. No. 4. pp. 395–398. With 5 text figs. [2 refs.]

CHATELLIER (L.) & LAURENTIER (Ch.). Sur un cas de lèpre à Toulouse.—*Bull. Soc. Française Dermat. et Syph.* 1926. Feb. No. 2. pp. 134–135.

DELAMARE (G.). Tuberculoïde atypique de la lèpre et microfilariose.—*Progrès Méd.* 1926. Jan. 23. No. 4. pp. 119–121. [5 refs.]

HOFFMANN (W. H.). El problema de la lepra bajo los aspectos modernos. [Modern Aspects of the Leprosy Problem.]—*Rev. Med. y Cirug.* Habana. 1926. Feb. 25. Vol. 31. pp. 119–124.

LITTLE (E. G. Graham). Case of Acute Nodular Leprosy.—*Proc. Roy. Soc. Med.* (Sect. of Dermat.) 1926. Aug. Vol. 19. No. 10. pp. 65–66.

RAEVSKY (A. S.). The Forgotten Infection of the South-East of USSR. [Leprosy.]—*Rev. Microbiol. et Epidémiol.* 1926. Vol. 5. No. 3. English summary pp. 230–231. [In Russian pp. 137–138.]

TROPICAL DERMATOLOGY.

LANGERON (M.). Travaux récents sur la classification des dermatophytes. **Recent Works on the Classification of the Dermatophytes.**]—*Ann. Parasit. Humaine et Comparée.* 1926. Apr. Vol. 4. No. 2. pp. 193–198. [7 refs.]

Since SABOURAUD's work the classification of the Dermatophytes seems stabilized. His classification, although very convenient from a practical and a clinical point of view, is not botanical, and the position of the apparently homogeneous group of Dermatophytes among the other groups of Hyphomycetes is not apparent. Further, the abundance of newly described forms renders the old genera too large and indefinite. In consequence of this, Langeron and OTA recently attempted a truly botanical classification of the Dermatophytes, which has aroused much opposition. Similarly, VUILLEMIN was led to introduce a new classification of the Arthrospores, which upsets his old arrangement of the classes of Conidiospores. The "aleurie" form of spore no longer characterizes an order but only a tribe, that of the Aleurismeae. Thus, an important and well marked group of Hyphomycetes, for the mere fact of possessing arthrospores, is transferred from the Conidiospores to the Arthrospores and is reduced in rank from that of an order to a tribe. In this re-arrangement, the Dermatophytes, which were placed among the Conidiospores, are nearly all placed in the Arthrospores and are mostly united with those Mycodermas for which other than mycelial spores are hardly known. It is hard to see why Dermatophytes possessing "spindles" are united with Fusoma where the mycelium is exceedingly reduced, rather than with Blastotrichum, which Langeron and OTA have shown to be much more closely related to the Dermatophytes. He also favours the retention of the so-called "medical genera" in favour of truly botanical genera.

GRIGORAKI's classification is objected to on the grounds that it is based on the old theory of MATRUCHOT and DASSONVILLE that the Dermatophytes are Gymnoascaceae that have lost their perithecium, which rests on the one doubtful case of *Eidamella spinosa*. Apart from the genus *Ateleothylax*, which all place in the Gymnoascaceae, he divides the Dermatophytes into two unequal parts: one, the family Atelogymnoascaceae, joined to the Gymnoascaceae, contains the new genera *Spiralia*, *Closterosporia*, *Closteroaleurosporia*, *Chlamydoaleurosporia* and *Aleurosporia*; the other contains the one genus *Arthrosporia* and is placed in the Arthrospores. These new names violate articles 44 and 45 of the International Code of Nomenclature; of which article 38 is also violated as the type species of the new genera are not indicated. Further, the new genera proposed by Langeron and OTA recur nearly intact with new names. Closteroaleurosporia corresponds to Sabouraudites; Aleurosporia contains only Trichophyton "sensu stricto"; Spiralia exactly corresponds to their sub-genus Aleurocloster (Sabouraudites); while the genus Arthrosporia unites Endodermophyton, Bodinia and Grubyella which they separated.

P. Tate.

MEDINA JIMÉNEZ (Rafael). Las afecciones micosicas en Venezuela. **Mycotic Affections in Venezuela.**—*Gac. Med. de Caracas.* 1926. Mar. 15. Vol. 33. No. 5. pp. 69–76. With 12 text figs.

In this paper the author makes brief remarks on the many forms of mycotic affections which he has met with in Venezuela. The following

are dealt with shortly : actinomycosis, trichophyton, mycetoma, sporotrichosis and bronchomoniliasis, while the major part of the paper treats in greater detail of certain skin affections classed together under the name *Carate*. This is very widespread, its main focus being the Zamora plains at the foot of the Cordilleras ; it also occurs on the banks of the Apure, Arauca, the upper Orinoco, and to a less degree in Mérida and Trujillo. Various moulds have been cultivated from the scales taken from patients suffering from these affections Aspergillus, Penicillium, Trichophyton, etc. Also a mould with short, broken hyphal filaments and spores of various size classed as a Malassiezia, and producing coloured dermatomycoses, red, brown, purple, blue and black, and some white. The author is of the opinion that the colour depends somewhat on that of the skin of the patient ; in whites, it is often brown, blue or black, but in the dark skins of a grey or ashy colour. The red variety has been seen only in the white races. One form does not confer immunity to others, for a case is recorded in which there was a blue form on the face and an ashy or mottled form on the body generally.

Photographs, not very well reproduced, are given to illustrate some of these conditions.

H. Harold Scott.

KATÔ (Yutaka). Note sommaire sur les trichophyties dans les provinces de Kiushiu et dans les îles de Liukiu et sur deux espèces nouvelles de Dermatophytes : *Trichophyton coccineum* et *Bodinia spadix* n. sp. [**Trichophytosis in Kiushiu and the Liukiu Islands. Two New Species of Dermatophytes.**] *Japan Jl. Dermat. & Urol.* 1926. Apr. Vol. 26. No. 4. French summary pp. 11–17. With 22 figs. on 4 plates. In Japanese pp. 306-358. With 21 text figs. 55 refs.]

In all, 184 cultures were obtained comprising the following species : *Bodinia violacea* Bodin 1902 , from 14 cases of superficial tinea, 3 of deep-seated tinea, and 1 of herpes circinata. *Bodinia glabra* [Sab. 1909 , a species rather rare in Europe, was found rather frequently, being isolated from 39 cases of superficial tinea, 4 of deep-seated tinea, and four of herpes circinata. *Grubyella ferruginea* Ota 1922 is the chief cause of tinea of the scalp and was found in 48 cases of superficial tinea, 7 of deep-seated tinea, and 9 of herpes circinata. *Trichophyton pedis* Ota 1922 , from 1 case of " eczema marginatum " dhobie itch , 1 of dysidrosis, and 2 of onchomycosis. *Sabouraudites asteroides* [Sab. 1909], from 3 cases of herpes circinata, 2 of eczema marginatum, 1 of dysidrosis, and 2 of onchomycosis. *Sabouraudites interdigitalis* [Priestley 1917 , from 3 cases of dysidrosis. *Sabouraudites ruber* (Castellani 1909) is the chief cause of eczema marginatum, being found in 15 cases, and also in 2 cases of superficial tinea, 1 of herpes circinata, 4 of dysidrosis and 5 of onchomycosis. *Epidermophyton cruris* Castellani 1905 , from 1 case of herpes circinata and 1 of dysidrosis. Two new species, *Trichophyton coccineum* n. sp. and *Bodinia spadix* n. sp. were also found.

Trichophyton coccineum n. sp. was obtained from 5 cases of superficial tinea, 3 of herpes circinata, 1 of dysidrosis and 1 onchomycosis. It was found in all parts of Kiushiu that were studied. It is a true " endothrix " form, and in the hairs forms long chains of spherical, ellipsoidal or cubical spores 4–7 microns wide. In nails it sometimes forms fine

hyphae 3–4 microns wide, and sometimes chains of relatively short cells 5–6 microns wide. Cultures are most characteristic at about three weeks old, when they form discs 6–7 cms. in diameter. There is a large central area covered with a reddish down and with a central depression from which furrows radiate. Outside this, there is an immersed area deep purple in colour with scattered powdery patches; and a peripheral immersed ring, pale cream in colour when seen through the medium. The mycelium is fine, and racket-shaped hyphae are common. Aleuriospores are borne on simple or branched hyphae, and chlamydospores, remarkable for their large size and irregular shape, occur terminally on lateral hyphae or in chains. Inoculation of the hairy skin of a child was positive after 35 days. Inoculation of guineapigs, rabbits and dogs was also positive, but with these animals it behaved as a pure "ectothrix".

Bodinia spadix n. sp. was found once in the case of a child with superficial ringworm. The clinical aspect resembles that caused by *Bodinia violacea*. It behaves as a large-spored "endothrix". Cultures on glucose agar are most characteristic in about three weeks, when they form thin discs scarcely to be distinguished from the medium except by the colour and the extremely fine furrows radiating from the centre. There is a grey pleomorphic down. The mycelium is fine, about 3 microns wide, sparsely septate, and develops racket-shaped hyphae, mycelial spores, and terminal and intercalary chlamydospores. Inoculation was positive with guineapigs, rabbits, dogs and cats, the latter being the most susceptible.

P. Tate.

WACHOWIAK (M.) & FLEISHER (Moyer S.). **Epidermomycosis of the Sole caused by Monilia and Yeast.** —*Arch. Dermat. & Syph.* 1926. June. Vol. 13. No. 6. pp. 815–818. [2 refs.]

Report concerning two male cases, with circumscribed superficial vesicular lesions on the soles resembling those of an epidermomycotic infection. Cultural investigations, described in detail, revealed from the one case a yeast-like organism to be classed possibly as Cryptococcus, while the other showed a Monilia.

W. Jenkins Oliver.

DOHI (K.), TAKAHASHI (Sh.) & SUZUKI (S.). Ueber den vierten Fall von Mycetoma pedis in Japan. [Abstract.] [**The Fourth Case of Mycetoma Pedis in Japan.**]—*Japan. Jl. Dermat. & Urol.* 1925. Oct. Vol. 25. No. 10. pp. 97–99. With 5 figs. on 2 plates. [In Japanese pp. 803–827. With 9 text figs. [17 refs.]

This case of Mycetoma pedis involved the left foot of a peasant aged 43 years, from the neighbourhood of Tokio. The first eruption had appeared four years previously, and, when observed, the whole foot was greatly swollen, and reddish, soft, solid tubercles varying in size from that of a rice grain to that of a bean were present on the diseased area. Yellowish pus containing similarly coloured grains could be expressed from the tubercles. The bones were not attacked. The grains, formed of closely interwoven masses of thin, non-segmented hyphae, were roundish, kidney-, horseshoe-, or ring-shaped; and in section showed a central zone, a deeply coloured compact zone, and a peripheral zone of fine threads. Treatment not proving effective,

amputation was performed. Cultures of an organism closely resembling *Nocardia bovis* [*Discomyces bovis* Harz, 1877 were obtained.

The organism grows readily on ordinary media both liquid and solid, either aerobically or anaerobically, but growth is better under aerobic conditions. Gelatine is liquefied and on certain media (e.g. Sabouraud's sugar agar) a characteristic scent and a dark brown pigment are developed. The mycelium, which is Gram positive and slightly acid fast, consists of long, branched, nonsegmented hyphae 0·3–0·7 microns wide, by the fragmentation of which chains of roundish spores of a similar diameter are produced. On media containing sugar or glycerine there is a tendency for terminal or intercalary enlargements to be formed. It is very resistant to heat and cold. Mention is made of the toxic effect of various organic and inorganic poisons and organic dyes on the growth of the organism in bouillon cultures. Animal inoculation was negative.

P. Tate.

RFENSTIERNA (J.). Reproduction expérimentale du mycétome chez le lapin. [**Experimental Mycetoma in the Rabbit.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 101–107. With 4 figs. on 1 plate. [9 refs.]

By inserting a thread impregnated with a culture of *Nocardia madurae* (Burnet & Broc) [*Discomyces madurae* Vincent 1894] in the right testicle of a rabbit, a normal thread being inserted in the left testicle as a control, the development of a small nodule about the size of a pea was incited. This contained hyphae and sclerotia, and when inoculated on Sabouraud's medium gave a slight fungous growth on one tube, which could not be sub-cultured. Four rabbits were inoculated with a portion of the nodule, and one, inoculated in the testicle, developed a small nodule, which contained a few degenerating hyphae; but cultures, and re-inoculation of rabbits failed.

P. Tate.

PALMER (F. J.). **A Case of Madura Foot treated by Chemotherapy. Apparent Cure.**—*Indian Med. Gaz.* 1926. Feb. Vol. 61. No. 2. p. 74.

Concerns an elderly Indian, a chronic leper, with a condition of the right ankle region diagnosed as Madura foot. Healing of the foot lesions followed the treatment, spread over seven months, consisting of 9 intravenous injections of bismuth sodium tartrate (grains 2½–4), intermingled with 4 intravenous injections of copper citrate (grains 2½) plus 1 grain pills of this latter drug in 5 ten day courses.

W. J. O.

BURNET (Et.) & BRUN (G.). XVIIe observations tunisienne de mycétome. [**17th Observation of Mycetoma in Tunis.**]—*Arch. Inst. Pasteur de Tunis.* 1926. June. Vol. 15. No. 2. pp. 151–153. With 1 text fig.

Case report concerning a native, aged 28 years, in whom the condition affecting the left foot was of 7 years' duration. The foot was swollen to double the normal size, shapeless and covered with numerous small vesicular nodules. The corresponding inguinal glands were

enlarged. Radiological examination showed severe lesions of the tarsal bones. The particular infecting fungus is not described. Amputation at the lower third of the limb was performed.

W. J. O.

MANGABEIRA-ALBERNAZ (P.). L'ulcère phagédénique tropical et son traitement par les insufflations de bismuth. **Tropical Ulcer and its Treatment by Insufflations of Bismuth.** —*Bull. Soc. Path. Exot.* 1926. Feb. 10. Vol. 19. No. 2. pp. 115–127. [67 refs.]

The local application of pure acid potassium tartrobismuthate and of potassium sodium tartrobismuthate in the form of insufflations of the powder directly to the lesions is recommended, on account of the antispirochaetal action of the salts and of the rapid diminution of pain accompanying this mode of treatment. The insufflations are so given as to deposit about 1 gm. of the salt on each daily application; an average case requires 4–5 such dressings. The author has treated 64 cases by this method, five of which are described. Similar treatment has proved equally beneficial in Vincent's angina. Emphasis is laid on the condition of "tropical ulceration" being always a secondary contamination by the specific organisms. The effect of the treatment in question is compared with that of other methods exerting either a local or indirect action on the specific lesions.

W. J. O.

SILVESTRO (Lottico). Ulcera tropicale in Tripolitania. **Ulcus Tropicum in Tripolitania.** —*Riforma Med.* 1926. May 17. Vol. 42. No. 20. pp. 474–475.

The author describes a form of treatment of phagedaenic tropical ulcer which has yielded in his hands excellent results and he illustrates his remarks by brief records of four cases. The site of the ulcer and its surroundings are thoroughly cleansed, then treated with benzine to remove fatty secretion and disinfected with 1 per cent. acetic acid alcohol. He next cauterizes the ulcer with nitrate of silver three or four times, and dusts with iodoform in powder. Dumesnil's "Dermoplastol" as an ointment is applied to the surrounding area, the whole is covered with a layer of gauze and, by means of a special apparatus and a crêpe-Velpeau bandage the author obtains a diminution of the superficial circulation with increase of the deep. The patient is able to be up and about during the treatment, which is repeated every four or five days.

H. Harold Scott.

WEHRLE (O.). Die Behandlung des Ulcus tropicum mit Desitin. **Treatment of Ulcus Tropicum with Desitin.** —*Arch. f. Schiffs- u. Trop.-Hyg.* 1926. Aug. 1. Vol. 30. No. 8. pp. 348–349.

The use of "Desitin" in the form of an ointment applied on lint to the ulcer and surrounding tissue, to be changed daily or every second day, at the commencement of treatment, is recommended. By such means the author claims to have obtained healing of the lesions in much shorter time than by other measures.

W. J. O.

ESCOMEL (Edm.). Une dermatite climatérique : la *Chapetonada.* **Chapetonada : a Climatic Dermatitis of Arequipa.** *Presse Méd.* 1926. June 12. Vol. 34. No. 47. pp. 747–748.

——. La Dermatitis Climática que se denomina "Chapetonada" en Arequipa—Perú.—*Gac. Med. de Caracas.* 1926. May 15. Vol. 33. No. 9. pp. 131–133.

The denomination of this disease in Peru is traced back to the old slang term used in some South American countries in reference to the Spaniards. The affection appears due to the climatic change, experienced more especially by women and young children, on descending to the sea level from higher altitudes. The condition consists of urticarial and erythematous lesions, associated with intense pruritus mainly at night, and distributed particularly on the limbs, hands, face and neck. Such lesions become transformed into pruriginous papules, with vesicular and occasional bullous elements. The duration of the condition is variable ; some cases only recover on their return to their homes in cooler higher districts. The general health remains good ; there may be slight leucocytosis ; fever is absent. The disease is not contagious, nor is it inoculable or autoinoculable. The prognosis is always good. Treatment consists of a saline purge, adrenalin solution by the mouth, and the local application of a menthol lotion.

W. J. O.

ACTON (Hugh W.). **Prickly Heat.** *–Indian Med. Gaz.* 1926. July. Vol. 61. No. 7. pp. 321–324. With 2 text figs.

A brief account of the affection, which is considered to be due to an infection of the sweat gland orifices by staphylococci, from associated seborrhoeic lesions, occurring in persons improperly clad under tropical conditions. The essential point in the treatment is the recognition of the accompanying seborrhoea, with the infective seborrhoeic organisms, as the pathogenic factors. The rash is treated locally by the application of an antiseptic dusting powder, lightly dusted over the affected areas, consisting of sulphur 1, camphor 1, zinc oxide 2, starch 3, boric acid 1 parts.

W. J. O.

HEMMES (G. D.). Een geval van "creeping disease". **A Case of Creeping Disease.** *Nederl. Tijdschr. v. Geneesk.* 1926. July 24. 70th Year. 2nd Half. No. 4. pp. 401–402. With 1 text fig.

Description of a case in a man aged 30, who never had been abroad (village of Heteren, province Gelderland, Netherlands). The site was the volar side of left hand and wrist. The lesion showed as a prominent red line $\frac{1}{20}$ of an inch in breadth and $2\frac{1}{2}$ inches long (from end to end, not counting the numerous convolutions). It had grown as far in 8 days. Endeavours to extract a parasite (refrigeration, incisions) although completely negative were followed by its disappearance within a few days, and so it is concluded that the parasite had been killed by freezing.

N. H. Swellengrebel.

REVIEWS AND NOTICES.

GRIXONI (Giovanni). [Colonnello Medico Direttore d. Scuola di Sanita Militare.] Geografia medica ed igiene dei nostri possedimenti coloniali. [**Geographical Medicine and Hygiene in Italian Colonial Possessions.** pp. viii + 229. With 3 folding maps. 1926. Rome: Provveditorato Generale dello Stato Libreria. [Collana medico-militare, pubblicata dal Ministero della Guerra Direzione Centrale di Sanita Militare Vol. 15.] [20 L.]

This is a small book which does not attempt to range outside the lines laid down in the title. It deals with tropical influences and the geographical distribution of diseases in the Italian Colonies and deals with them very well, although sometimes briefly. Every young Italian medical officer, whose future work may lie in warm climates, should read this book. Colonel Grixoni is Director of the Military Medical School and writes, in the first place, for military medical officers. The first 86 pages are divided into two Parts; Part I being a general account of the climatological and medical conditions found in hot countries from 32° S. to 36° N. latitude. Prof. Grixoni holds that—with due care and knowledge of hygiene—any European can adapt himself to life in almost any climate hot or cold. The difficulties are certainly greater in hot and tropical countries. Arctic conditions are, roughly speaking, controlled by warm clothing and plenty of food. In the tropics not only is it desirable to keep cool, but there is danger from the direct rays of the sun; there are dry, hot winds trying to the nervous system and, so far as climatic influences are concerned, there are greater possibilities for contamination of food and water. The effects of various meteorological conditions upon the systems and organs of the body are reviewed, and it is noted that the alimentary tract is very liable to disorders especially when hard work has to be done and fatigue is likely to ensue. Next follow sections on the principal diseases of hot climates, beginning with sun-stroke. These diseases are known and do not require detailed notice. The general history of several important diseases such as malaria, dysentery, smallpox and enteric fevers is recorded, and full references are made to workers who have contributed to our knowledge of tropical medicine. Parasitic diseases and the poisonous animals—snakes, anthropods, etc.—receive notice.

Part II, good within its limits, treats of hygiene and prophylaxis in warm countries, with sections on diet, water and work. The author also records the method of recruiting for colonial forces, gives tables of diet and directions for safeguarding the health of the soldiers. The rest of the book is taken up with three sections describing, in detail, the climatology, diseases, etc., of three Italian Colonies: Eritrea, Somalia and Lybia. It is not necessary to review these sections in detail. Nothing of importance has been omitted. Yaws, introduced from further west, and rare diseases such as "ainhum" and "latah" receive notice. There is a map and a full bibliography for each of these Italian Colonial possessions.

J. H. Tull Walsh

WENYON (C. M.). [C.M.G., C.B.E., M.B., B.Sc. (Lond.), Director-in-Chief of the Wellcome Bureau of Scientific Research, formerly Protozoologist to the London School of Tropical Medicine.] **Protozoology. A Manual for Medical Men, Veterinarians and Zoologists.** In 2 Volumes.—pp. xvi + ix + 1563. With 565 illustrations and 20 coloured plates. 1926. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C. 2. [Price 84s. net.]

This is the largest and most important recent work dealing with the Protozoa as a group; but as it deals with various other subjects also—most

of them of special interest to readers of this *Bulletin*—it seems desirable to indicate its contents more particularly.

The work is divided into six main parts, of unequal length : (i) " General description of the Protozoa," pp. 1–152 (Vol. I) ; (ii) " Systematic description of the Protozoa," pp. 153–778 (Vol. I) and 779–1229 (Vol. II) ; (iii) " Spirochaetes," pp. 1231–1288 (Vol. II) ; (iv) " Methods of investigation and Rules of Nomenclature," pp. 1289–1349 (Vol. II) ; (v) " Blood parasites of Vertebrates and Trypanosomidae of Invertebrates," pp. 1351–1414 (Vol. II) ; (vi) " References to literature—Protozoa and Spirochaetes," pp. 1415–1514 (Vol. II). A full index to both volumes (46 pages) terminates Vol. II.

With so variegated an assortment of subjects before him, the reviewer experiences some embarrassment in trying to consider the work as a whole ; and he has to confess, in the first place, that the title " Protozoology " seems to him a misnomer. Apart from the fact that the same name has already been given to another well-known treatise on the Protozoa by Calkins (1909)—a book not mentioned, by the way, even among the references—and also to a current periodical, it certainly does not adequately describe the contents of the present volumes. " Protozoology " is properly the name of the whole science of the Protozoa (excluding the Spirochaetes), and it appears no more applicable to the work under review than the title " Mathematics " would be to a book dealing with the differential calculus. For Wenyon's work is essentially a book on *medical* protozoology —using the term in its best sense. It deals chiefly with those Protozoa (and Spirochaetes) which are of particular interest to medical men, but deals with them in a manner agreeable to the conventions and canons of zoologists. It might perhaps be appropriately described as " A Dictionary of Protozoa and Spirochaetes for readers of the *Tropical Diseases Bulletin*." If anyone here seeks up-to-date information about most of those familiar " types " of Protozoa cherished by our instructors in " Elementary Biology," he will seek in vain. He will here find no adequate account, for example, of " *Amoeba proteus* "—practically nothing about its morphology, physiology, life-history, or about methods for its cultivation, and no mention of the divers species (and even genera) into which it has been resolved ; and he will find but one picture of it— dating from the year 1879—borrowed from a book to which no reference is given in the bibliography. Far more is now known of this and a host of other common protozoa than the present work might lead the uninstructed to imagine. But on the other hand, the reader will here find accurate and detailed information regarding the intestinal amoebae of man and other animals—accompanied by copious illustrations and references : while of the Trypanosomidae, again, he will find a full, up-to-date, well illustrated, and abundantly documented account, such as he cannot find in any other single work yet published.

But it is perhaps unfair to criticize the main title, since the subtitle qualifies it by saying that the work is intended for " medical men, veterinarians, and zoologists "—the order of precedence evidently implying that it is for medical men first, and for zoologists last of all. Again, the subtitle of the systematic section (Part II)—which forms the chief part of the treatise—definitely restricts the Protozoa to be dealt with mainly to " parasitic and coprozoic forms " ; while it obviously would not have occurred to any zoologist, writing for zoologists, to reprint the International Code of Nomenclature in a monograph on the Protozoa. Moreover, the inevitable criticism that the Spirochaetes are improperly comprised in a book on Protozoology is forestalled by the author in his preface, where he says that " though it is definitely maintained [by him] that they are not Protozoa," they have been included because " the study of spirochaetes is intimately related to that of the Protozoa, especially in connexion with blood work." It seems clear, therefore, that this treatise is intended as a comprehensive contribution to medical protozoology : and as such it is undoubtedly the best which has yet appeared in any language.

The classification employed does not, as a whole, depart in any notable particular from the best traditions, though several novel names are used. One curious result of the systematic arrangement adopted for the Mastigophora may, however, be noted. The author puts the Cystoflagellata in the sub-class Zoomastigina, and mentions only a single representative—*Noctiluca*; while he places the Dinoflagellata in a different sub-class—the Phytomastigina. Most protozoologists are now agreed, however, that *Noctiluca* actually *is* a dinoflagellate, as BÜTSCHLI long ago suggested: and to separate it from the rest of the Dinoflagellata by so great a gap as is here implied is surely difficult to justify. (It is, indeed, as difficult to understand as the omission of all reference to CHATTON's extensive work on the parasitic Dinoflagellata—a work which ought surely to be at least mentioned in any treatise on parasitic protozoa.) On p. 152 the reviewer is credited with the concept that the Protozoa constitute a sub-kingdom, rather than a phylum, of the animal Kingdom. He certainly holds this view, but never claimed to have originated it: for it was expressed, in the English literature, by J. R. GREENE as long ago as 1863; it was shared by no less an expert than O. BÜTSCHLI (1910); and its truth is assumed by everyone who uses the word "Metazoa."

To those who regard the Protozoa from a zoological rather than a medical standpoint, the sections dealing with general biological and cytological topics will probably appear least satisfactory. Part I, moreover, contains numerous loosely-worded statements which even the author himself can hardly be prepared to defend seriously. (For example: "Protozoa may be of almost any conceivable shape" (p. 19); and "all Rhizopoda . . . . are able to encyst under certain conditions" (p. 23).) Nevertheless, the reviewer acknowledges that, when reading this book, he has sometimes been in doubt whether statements which appear erroneous may not, in reality, have been made deliberately. They may be due to excess rather than to lack of knowledge. But whichever be the correct interpretation, the author has surely performed a remarkable feat in writing a section on "cytoplasmic inclusions" in the Protozoa without so much as mentioning mitochondria or the Golgi apparatus. Doubtless he also has reasons for using various accepted terms in an unconventional way: yet it may be pointed out that to write "synkarion" (for synkaryon); to speak of certain animals as "saprophytic" (instead of saprozoic); and to use "free-living" (properly the opposite of parasitic, *sensu lato*) as the antithesis of sessile, is to employ a terminology which is not countenanced by the best biological usage.

The accounts of typically free-living groups—such as the Radiolaria, Foraminifera, or Mycetozoa—appear to the reviewer unworthy of those dealing with parasitic forms. Of the three groups just mentioned, for example, not one is described in terms commensurate with modern knowledge; while most of the classical monographs on all three are missing from the references. On matters of ancient history, also, the work, as a whole, is deficient, though on recent developments of the medical aspects of the science it is almost incredibly up-to-date. It seems to the reviewer a mistake thus to focus attention on so many ephemeral productions of the present day, and to ignore the more lasting background upon which they now cast a fleeting image. It also seems to him remarkable that a work of this magnitude, and with this outlook, should totally ignore the first great contribution to applied protozoology—PASTEUR's "*Maladies des vers à soie*." But the reviewer realizes that this is probably because he is himself particularly interested in the early history of the subject, while the author manifestly is not: and he is well aware that, in this, modern medical opinion will side with the author.

By far the best parts of the book are—in the reviewer's opinion—those dealing with organisms which the author has himself investigated, and upon which he has previously published many well-known original memoirs. On such things as *Leishmania*, malaria, coccidiosis, and the intestinal protozoa of man and other animals, he writes with first-hand knowledge

and therefore writes with authority; and he here discusses facts and expresses views and conclusions which deserve—and will surely receive—the careful consideration of his co-workers. It is, indeed, safe to prophesy that no future worker on such subjects—at any rate for many a year to come—will be able to conduct his researches without frequent reference to these two volumes. In compiling them the author has laid all students of the parasitic protozoa under a deep obligation; and no working protozoologist can, in future, afford to be without them.

Considering the vast size and scope of this work, it appears to be relatively free from typographical errors, and those detected are for the most part trivial. It may be noted, however, that several proper names are misspelled throughout (e.g. "Muslow" for MULSOW, "Oltmann" for OLTMANNS); and that the organism shown in fig. 23—which is there called "*Cothurina*," but whose name is amended in the *errata* to "*Cothurinia*"—is really *Cothurnia*. Fig. 13 is labelled "*Holomastigoides*"—evidently a misprint for *Holomastigotoides* (or possibly *Holomastigotes*), since there is no such genus: yet the picture shows a *Pseudotrichonympha*. A new genus—*Spirillonema*—is seemingly proposed, in an unorthodox manner, on p. 747, though the name is first used on an earlier page (p. 739, wrongly indexed as 738); and on p. 45 a new protozoologist—"Nessel"—also figures, apparently owing to mistranslation of the German name for nematocysts (*Nesselkapseln*, = nettle- or stinging-capsules).

It may seem ungracious to call attention to bibliographic omissions from a work so generously documented, but nevertheless it seems regrettable that various older classics and several more recent monographs (such as LEIDY'S *Freshwater Rhizopods*, LANG'S *Lehrbuch*, and DELAGE and HÉROUARD'S *Traité*), from which illustrations and other matter have admittedly been borrowed, are not specifically cited among the references. The host-list of blood-parasites (Part V) will be of incalculable value to all students of these organisms: but here again, unfortunately, the records enumerated are not all traceable by the "references to literature" (e.g., LANGMANN'S work (1899) on the haemogregarines of snakes).

The foregoing comments are made in no spirit of hostile criticism. The reviewer, after reading the greater part of this work in a critical spirit, has derived much profit from its perusal and heartily recommends it to all serious students of the Protozoa. He does not pose as an "authority" on the group, since any kind of authority in matters of science is, to him, anathema. Protozoology is now, as he is well aware, so highly specialized a branch of biology that no one man can hope to master the whole of it. Experts on each several group of Protozoa will here find the objects dear to them described and discussed; and they will perhaps be tempted to judge the whole work according to the impressions which they receive from such details. But it would obviously be unfair to review a compendium of this magnitude in this way. The only man who could, with any competence, criticize a work like this in its entirety, would be one who had himself covered the same ground in his own studies, and had surveyed the same field from the same angle as the author. It is safe to say that no such man exists. The reviewer—being fully aware of this—therefore makes the foregoing comments with diffidence. He has studied the Protozoa and Spirochaetes for about the same length of time as the author, but from a different standpoint; and accordingly the work seems to him most open to criticism on those subjects of which he imagines he knows most. But as regards those branches concerning which he is most ignorant, he has found it a true treasury of information. He has noted numerous omissions and—as he believes—errors in the sections dealing with the groups with which he is personally familiar; but he has also found, in the disquisitions on organisms of which he knows little or nothing at first hand, many things of which he was totally ignorant, and valuable references to works which he not only has not seen, but has never even heard of. He is therefore convinced that this is a book of inestimable value to all working

protozoologists, though more especially to those interested in medical aspects of the subject.

It remains to add that the general get-up of the volumes is admirable. The illustrations are on a lavish scale, and for the most part excellent. The publishers have evidently spared no expense in production; but the use of highly glazed "art" paper, while insuring a brilliant impression of letterpress and figures, has made the two volumes inordinately heavy (they weigh together about 10 lbs.) and ill-fitted for life in a hot and damp climate.

In the past, the reviewer has often been asked, especially by medical workers in the tropics, to recommend some trustworthy English book which would give them just the information needed to enable them to pursue the subject of medical protozoology with profit. He gratefully acknowledges that in these two volumes he has now at last found an answer to this hitherto unanswerable question.

Clifford Dobell.

ERRATA.

Vol. 23. No. 8. p. 605. SCHÜFFNER & RUYS summary. (Weil's disease), line 6. For "Leptospira showed agglutination . . . with the patient's serum in dilution of *1 : 5000 (15th day), 1 : 2500 (24th day), 1 : 1000 (44th day)*" read "*1 : 5000 (15th day), 1 : 25000 (24th day), 1 : 1000 (44th day).*"

No. 9, p. 662, top line, for LEVIA read LEIVA.